

Before the  
Federal Communications Commission  
Washington, DC 20554

In the Matter of	)	
	)	
Service Rules for the 698-746, 747-762	)	WT Docket No. 06-150
and 777-792 MHz Bands	)	
	)	
Revision of the Commission's Rules to	)	CC Docket No. 94-102
Ensure Compatibility with Enhanced 911	)	
Emergency Calling Systems	)	
	)	
Section 68.4(a) of the Commission's Rules	)	WT Docket No. 01-309
Governing Hearing Aid-Compatible	)	
Telephones	)	
	)	
Biennial Regulatory Review – Amendment	)	WT Docket No. 03-264
of Parts 1, 22, 24, 27, and 90 to Streamline	)	
and Harmonize Various Rules Affecting	)	
Wireless Radio Services	)	
	)	
Former Nextel Communications, Inc.	)	WT Docket No. 06-169
Upper 700 MHz Guard Band Licenses	)	
and Revisions to Part 27 of the	)	
Commission's Rules	)	
	)	
Implementing a Nationwide, Broadband,	)	PS Docket No. 06-229
Interoperable Public Safety Network in the	)	
700 MHz Band	)	
	)	
Development of Operational, Technical	)	WT Docket No. 96-86
and Spectrum Requirements for Meeting	)	
Federal, State and Local Public Safety	)	
Communications Requirements Through	)	
the Year 2010	)	

**INITIAL COMMENTS OF FRONTLINE WIRELESS, LLC**

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## TABLE OF CONTENTS

I.	OPEN ACCESS/WHOLESALE WIRELESS SERVICE IS ESSENTIAL TO PROMOTE COMPETITION, INNOVATION AND BROADBAND DEPLOYMENT. ....	3
A.	The 700 MHz Auction Is the Last Real Opportunity to Promote Competition and Innovation in the Wireless Market. ....	4
1.	Promoting Competition Is an Important Public Policy Goal. ....	4
2.	The 700 MHz Auction Gives the Commission the Opportunity to Promote Competition for the Next Generation. ....	7
3.	Operating a Network and Providing Retail Services to Consumers Are Distinct Services and Can Be Provided Separately. ....	8
B.	Competition, Innovation, and Broadband Deployment Are Threatened by Market Concentration and Consolidation. ....	9
1.	The Wireless Market Is Concentrated. ....	9
2.	The Broadband Market is Concentrated. ....	14
3.	Concentration in the Wireline Markets Exacerbates Wireless Concentration, Since the Two Are Fusing Together. ....	15
C.	Frontline’s Plan Provides the Commission with an Opportunity to Address Market Concentration and Consolidation by Creating a Pro-Competitive Environment. ....	16
1.	Wholesale Service Rules Will Promote Competition and Innovation. ....	17
2.	Open Access Rules Promote Competition and Innovation. ....	20
3.	The E Block Licensee Should Be Required To Offer An Open Auction Service On At Least 25% Of Its Commercial Network Capacity. ....	23
4.	Roaming Rules Will Promote Competition, Innovation and Rural Coverage. ....	24
II.	THE E BLOCK RULES MUST ENABLE A NATIONWIDE, INTEROPERABLE NETWORK FOR PUBLIC SAFETY COMMUNICATIONS. ....	26

A.	The Commission Has Rightly Recognized That Public Safety Is in Desperate Need of an Interoperable, Nationwide Broadband Network. ....	27
B.	The Frontline Plan Overcomes the Two Principal Obstacles to Creation of a Nationwide, Interoperable Public Safety Network. ....	29
1.	Funding a Multibillion Dollar Network.....	32
2.	Accessing at Least 22 MHz of Spectrum in Times of Emergency. ....	36
C.	Frontline’s Proposed Rules Ensure That the Shared Network Will Serve the Communications Needs of Public Safety.....	39
1.	Enforceable Buildout Standards for Nationwide Coverage.....	40
2.	Public Safety Control at the Local Level.....	42
3.	Network Sharing Agreement Between the National Public Safety Licensee and the E Block Licensee. ....	42
4.	Preventing Discontinuance of Service. ....	47
5.	Freedom of Equipment Choice. ....	48
D.	Licensing the Spectrum to Large Incumbent Providers Will Not Solve the Needs of the Public Safety Community.....	49
III.	THE COMMISSION SHOULD ADOPT A BAND PLAN AND AUCTION RULES THAT MAXIMIZE THE CAPACITY OF THE PUBLIC/PRIVATE SHARED NETWORK, MAKE SMALLER LICENSE AREAS AVAILABLE, AND ENABLE OPPORTUNITIES FOR NEW ENTRANTS. ....	51
A.	Commercial Band Plan. ....	51
B.	Public Safety Band Plan.....	54
C.	The Commission Must Adopt Auction Rules, Including Anonymous Bidding, That Facilitate Bidding by New Entrants.....	56
IV.	CONSISTENT WITH CONGRESS’S WILL, THE COMMISSION SHOULD MAKE BIDDING CREDITS AVAILABLE TO QUALIFIED SMALL BUSINESSES IN THE E BLOCK AUCTION.....	58
A.	Despite an Express Congressional Mandate to Encourage Small Business Participation in the Communications Industry Via Bidding Credits, the <i>Further Notice</i> Tentatively Concluded to Withhold Them in the E Block Auction.....	58

B.	Small Business Bidding Credits Are Particularly Appropriate For the E Block Auction. ....	66
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## SUMMARY

When the Commission auctions a full 60 MHz in the 700 MHz band later this year, it will make history — for good or for ill. It will auction the largest amount of prime, low-band spectrum ever and could set the nation on a path of wireless competition and innovation, aggressive broadband deployment and, at last, state-of-the-art, interoperable public safety services. The promise of the right path is tremendous, the risks of the wrong one are as large, and the opportunity to choose between them will never come again. The right path is the one that solves the following current and looming crises in the provision of wireless, broadband and public safety services:

- The wireless market is an oligopoly, trending towards duopoly, and the broadband market is already a duopoly market in most of America and a monopoly market in the rest of the country. Incumbent wireless providers are vertically integrated with wireline essential facilities and have the means and incentives to block innovative applications and competing services, as well as to lock up spectrum defensively to constrain supply. These are problems not only for consumers, but also for public safety entities that should not be subjected to the control of a single entrenched provider.
- After ten years of advanced wireless rollout, broadband deployment and penetration in the U.S. are inadequate and compromise American competitiveness and citizen participation. Robust and universally available 4G services are today merely a dream. Without greater competition and the innovation that competition spurs, this dream will not be realized.

- Public safety lacks sufficient spectrum for interoperable nationwide services in times of emergency, lacks the funds to build or purchase access to such services, and faces the prospect of bondage to a single equipment service provider and to a limited set of devices.

Auction and service rules, whatever their design, will structure the market for broadband and wireless services, as well as respond or not respond to the needs of the public safety community that protects and serves us all. The Commission can choose to solve the problems listed above, or it can extend the status quo for generations into the future.

The Frontline Plan, first submitted to the Commission on February 26, 2007, charts the proper course for these seminal decisions. The Plan is built on the Commission's own vision for a public/private partnership to build and operate a shared broadband network that will meet public safety's two greatest needs — the need for a way to fund network buildout and the need for more spectrum in times of emergency. The Plan is similarly innovative in its application to commercial service needs by allocating the E Block spectrum for open access, wholesale and roaming operations. It newly proposes that the E Block licensee operate an ongoing open auction on part of its network, building on auction techniques first developed by eBay and Google. Also, because the Plan proposes a shared network for public safety and commercial uses, it also optimizes efficient use of this spectrum's capabilities.

In addition to providing specific recommendations for implementing this vision, Frontline's comments also address three important issues — the band plan, the need for smaller as well as larger license areas, and provision for anonymous bidding.

Finally, Frontline shows why, in the E Block auction, the Commission should not withhold from otherwise qualified small businesses the bidding credits that Congress mandated

in 1993 for the purpose of encouraging new entrants in the communications industry. Congress mandated that in an auction, one important Commission obligation is to promote new competition and innovation for the benefit of both commercial and public safety users, and for that reason small business bidding credits are both especially appropriate and vital, given the vast financial resources of the wireless incumbents who will protect their oligopoly power, stifle innovation and have shown no willingness to satisfy public safety's needs.

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**INITIAL COMMENTS OF FRONTLINE WIRELESS, LLC**



## INTRODUCTION

Four weeks ago the Commission issued a *Report and Order and Further Notice of Proposed Rulemaking* (“*Report and Order and Further Notice*”) in these proceedings.<sup>1</sup> The *Report and Order* resolved certain issues and the *Further Notice* teed up numerous other issues for expedited resolution. Because the plan submitted to the Commission on February 26 by Frontline Wireless, LLC (“Frontline Plan”) had earlier addressed many of these *Further Notice* issues, the Commission asked for comment on the suitability of Frontline’s proposals for resolving these issues. Responsive to the Commission’s *Further Notice*, these initial comments (1) show how the Frontline Plan will bring competition and innovation into a wireless and broadband marketplace that is being stifled by accelerating consolidation, (2) demonstrate how and why the Frontline Plan will also solve the staggering problems facing the public safety community in seeking to do its incalculably important job with up-to-date communications tools, (3) identify the band plan option that would optimally serve the public interest, and (4) demonstrate that the E Block auction is far from an appropriate occasion for the Commission to deviate from Congress’s directive to make bidding credits available to qualified small businesses.<sup>2</sup>

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<sup>1</sup> See *Service Rules for the 698-746, 747-762 and 777-792 MHz Bands, et. al.*, Report and Order and Further Notice of Proposed Rulemaking, WT Docket Nos. 06-150, 01-309, 03-264, 06-169, 96-86, CC Docket No. 94-102, PS Docket N. 06-229, FCC 07-72 (rel. April 17, 2007) (“*Further Notice*”).

<sup>2</sup> Previous Frontline submissions have further elaborated and justified the Plan. See Comments of Frontline Wireless, LLC, *Service Rules for the 698-746, 747-762 and 777-792 MHz Bands*, WT Docket No. 06-150 (March 6, 2007) (“Frontline Service Rules Comments”); Comments and Reply Comments of Frontline Wireless, LLC, *Implementing a Nationwide, Broadband, Interoperable Public Safety Network in the 700 MHz Band*, PS Docket No. 06-229 (Feb. 26, 2007 and March 13, 2007) (“Frontline Public Safety Comments and Reply Comments”). Frontline’s Plan has been substantially improved in the interim, as a result of reactions from the Commission itself, Senators and Representatives, the public safety community, representatives (continued...)

**I. OPEN ACCESS/WHOLESALE WIRELESS SERVICE IS ESSENTIAL TO PROMOTE COMPETITION, INNOVATION AND BROADBAND DEPLOYMENT.**

The Commission is at a crossroads with respect to the wireless services market in this country. The commercial wireless industry is rapidly consolidating and, as a consequence, will not deliver the innovation and competitive service offerings that benefit consumers and that advance American competitiveness. The upcoming auction of 700 MHz spectrum offers the Commission an opportunity to open the existing wireless oligopoly with a light touch and in an economically efficient way. In deciding how to allocate this spectrum for the wireless services market, the Commission can either maintain the status quo and allow the valuable 700 MHz spectrum to be carved up by the current oligopolists, or it can take far-sighted action to ensure robust competition for American consumers in the future. Adopting the proposed Frontline Plan for a small portion of the spectrum to be auctioned for wholesale, open-access use will result in exponential benefits in the form of increased competition and innovation in the commercial wireless market and expanded, interoperable, state-of-the-art public safety service. The 700 MHz Auction will prove to be a pivotal event in the history of American telecommunications. Frontline urges the Commission to seize this historic moment to boost public safety, market competition and American innovation for generations to come. The public interest deserves and requires no less.

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of the high tech industries, critical infrastructure providers, smaller cellular operators, public interest groups and various other constituencies.

**A. The 700 MHz Auction Is the Last Real Opportunity to Promote Competition and Innovation in the Wireless Market.**

**1. Promoting Competition Is an Important Public Policy Goal.**

Market competition is the most effective way to lower prices, increase output, and promote diversity and innovation of many kinds. For these reasons, the Commission has long recognized the benefits of promoting competition as a public policy goal.<sup>3</sup> For similar reasons, Congress has statutorily mandated that the Commission pursue and implement pro-competitive policies.<sup>4</sup>

History demonstrates that where competition is present, innovation follows. The success of the Internet, for instance, depended heavily upon the Commission's *Computer Inquiry* proceedings and the pro-competitive policies that resulted. As another example, cable broadband was the direct result of the facility upgrades the cable industry undertook in response to satellite competition. The competitive threat of cable broadband, in turn, was largely responsible for the rise of DSL, a service that incumbent wireline providers had delayed deploying to avoid losing monopoly profits on their customers' secondary "dial up" lines.

The history of the wireless market tells a similar story. The Commission's implementation of the spectrum auctions authorized by the 1993 Budget Act was instrumental in creating the competitive environment that ushered in the modern wireless industry in the mid-

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<sup>3</sup> See, e.g., Eleventh Report, *Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services*, WT Docket No. 06-17, at ¶16 (rel. Sept. 29, 2006) ("*Eleventh CMRS Competition Report*") (stating that benefits of competition include "lower prices, higher quality, greater variety, and more rapid innovation").

<sup>4</sup> Omnibus Budget Reconciliation Act of 1993, Pub. L. No. 103-66; Conference Report, Telecommunications Act of 1996, Report No. 104-458 (Jan. 31, 1996). See also Public Notice, "WTB Seeks Comment on CMRS Market Competition," WT Docket No. 07-71 (rel. Apr. 6, 2007) ("Congress established the promotion of competition as a fundamental goal for Commercial Mobile Radio Service ('CMRS') policy formation and regulation.").

1990s.<sup>5</sup> The auctions were critical because they created a pro-competitive market structure through their service rules. These measures — which included spectrum caps, bidding credits that helped firms aggregate capital, and rules forcing bidding teams to assemble by the short form deadline — gave birth to competitive multi-firm markets. As a result, consumers enjoyed significant welfare gains including falling prices, increased penetration, greater diversity, and innovative service offerings.

Set against the dynamic history of the 1990s, developments of the last few years in the wireless industry are disturbing. As documented below, the low-frequency incumbent wireless carriers, i.e., Verizon and AT&T, have sought to limit the use of innovative technologies that challenge their own dominance. The rapid concentration underway in both the wireless and broadband access markets threatens competition and, in doing so, threatens the substantial consumer benefits that accompany competition. While spectrum auctions have been very successful in getting wireless service out to consumers, the Commission can no longer take it on faith that auctions alone will maintain a robustly competitive environment in which the needs of all Americans are served.

Market concentration threatens the wireless and broadband markets because of their unique characteristics. Because market entry is prohibitively expensive, market concentration can easily solidify into permanent oligopolies and duopolies. These entry barriers are exacerbated by the fact that today's wireless and broadband markets are dominated by legacy

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<sup>5</sup> Notice of Proposed Rulemaking, *Implementation of Sections 309(j) and 337 of the Communications Act*, WT Docket No. 99-87, ¶3 (1999) (“The 1993 Budget Act expressly authorized, but did not require, the Commission to use competitive bidding to choose among mutually exclusive applications for initial licenses or construction permits. Following enactment of the 1993 Budget Act, the Commission instituted a rule making proceeding to implement Section 309(j).”).

incumbents and their affiliates who have strong incentives to prevent the emergence of new wireless competitors (particularly wireless broadband competitors). As a result, they have every incentive to raise these already-formidable barriers even higher. With respect to spectrum, for instance, the current market concentration makes it *economically rational* for low-frequency incumbents to purchase and warehouse spectrum, particularly the scarce low-frequency 700 MHz spectrum that is being auctioned here and that is best-suited for broadband competition. Indeed, the advantage of denying spectrum to a new entrant is so valuable that an incumbent will likely pay a “blocking premium” to obtain it.

The ability to obtain access to spectrum is critical to meaningful market competition in both a technical and legal sense. Indeed, through the upcoming spectrum auction, the Commission is not only making additional wireless service technically possible, it is granting the provider the legal authority to enter the market and compete. Because retail providers cannot rely on consolidated and vertically integrated incumbents (particularly if they are retail competitors) to meet their vital spectrum needs, the auction is critical to the future of spectrum access, and thus wireless service. Without structuring the auction in pro-competitive ways, the wireless world will consist of closed networks offering closed services on closed devices.

In short, the status quo is untenable and unacceptable. The trend lines are clear. Without pro-competitive measures now, the market will grow increasingly consolidated and concentrated, and the readily-achievable goal of market competition — the goal Congress and the Commission have worked so hard to attain — will be lost for decades to come. The loss of competition, in turn, will inevitably lead to higher prices, stifled innovation, and reduced diversity of service offerings. It will also ensure that America will follow — rather than lead — the rest of the world in providing and developing advanced wireless services.

## **2. The 700 MHz Auction Gives the Commission the Opportunity to Promote Competition for the Next Generation.**

The 700 MHz auction is the Commission's last, best opportunity to ensure that consumers will benefit from competition in the wireless and broadband markets. Because there are no other significant auctions on the horizon, the Commission must ensure that this spectrum, which offers powerful opportunities for advancing public policy goals, is used to promote a pro-competitive environment.

The 700 MHz spectrum is commonly referred to as “beachfront property” because of its unique propagation characteristics.<sup>6</sup> It is important, however, to understand exactly how these “beachfront” characteristics could translate into more robust market competition. Specifically, the 700 MHz spectrum can promote competition in the wireless and broadband markets because it reduces and eliminates barriers to entry. All spectrum is not created equal. Communications carried on lower-frequency spectrum travel farther, penetrate buildings and obstructions more easily, and are more resilient than communications carried on higher-frequency spectrum. As a result, *carriers operating on lower-frequency spectrum require only a fraction of the capital infrastructure that carriers on higher-frequency spectrum require to provide comparable coverage and network reliability.*

One of the most daunting barriers to entry in the wireless market is the upfront, fixed costs of building a network. Accordingly, one of the most effective ways to reduce this set of significant capital expenses — and thus facilitate entry — is to use spectrum that requires fewer facilities. It is no accident that the two largest wireless carriers today were handed (*for*

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<sup>6</sup> See, e.g., *Telephony*, “Public Safety Eyes 700 MHz Spectrum,” April 9, 2007 (“Often likened to ‘beachfront property,’ the 700 MHz band not only can support 4G mobile broadband services, it also has excellent propagation characteristics and could enable broad geographic coverage[.]”).

*free*) the low-frequency 800 MHz spectrum in the early days of cellular.<sup>7</sup> These incumbents enjoy significant competitive advantages which stem from decades-old grants of low-frequency spectrum. Verizon and AT&T see significantly higher revenue per minute and lower customer churn than their PCS-only competitors.<sup>8</sup> These two companies now account for approximately two-thirds of all net customer additions in the industry and over 75 percent of net additions among national carriers.<sup>9</sup> If these incumbents successfully corner the 700 MHz spectrum as well, there will be no realistic opportunity for meaningful competition.

### **3. Operating a Network and Providing Retail Services to Consumers Are Distinct Services and Can Be Provided Separately.**

The open access and wholesale requirements of the Frontline Plan ensure that the 700 MHz beachfront property will be used for pro-competitive purposes regardless of who wins the E Block license. The anti-competitive effects of the current oligopoly market structure would not be solved by the creation (or expansion) of one more oligarch, which would likely be the result of licensing the E Block with no additional requirements. As explained in detail in the

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<sup>7</sup> See Report and Order, *Amendment of the Commission's Rules to Establish Competitive Service Safeguards for Local Exchange Carrier Provision of Commercial Mobile Radio Services*, 12 FCC Rcd 15668, ¶ 6 (1996) (“[I]n 1981, . . . the Commission amended Part 22 of the rules to provide for the authorization of two cellular licensees in each market — one wireline carrier and one non-wireline carrier.”) (“*Competitive Service Safeguards Order*”).

<sup>8</sup> See, e.g., Merrill Lynch “US Telecom Services: US Wireless Matrix 4Q06,” at 1, 31 (March 30, 2007), (research report) (“*Merrill Lynch Research Report*”); see also RCR Wireless News, “Study: Coverage Still King,” Jan. 22, 2007 citing a study showing that wireless coverage is the number one reason consumers switch carriers (“Wireless subscribers still covet broad network coverage-and will switch carriers to get it, according to a new survey of mobile users by comScore Networks. About 27 percent of survey respondents who had switched to a new carrier cited ‘better coverage’ as their primary reason for switching[.]”). Also note that Verizon and AT&T’s low and dropping churn rates imply that their customers are not switching to competitors’ networks, presumably at least in part because of the superior coverage the low-frequency networks provide relative to the PCS-only competition.

<sup>9</sup> *Merrill Lynch Research Report*, at 3.

attached paper by Drs. Skrzypacz and Wilson, the mandatory provision of network connection services on a wholesale level can give rise to greater opportunities at the retail level than currently exist today. While physical properties limit the number of overlapping national, facilities-based networks, no such limit need apply at the application interface (or retail) level.

The Frontline Plan de-links (1) the need to own both spectrum and physical network facilities to offer connectivity, from (2) creative retailers' ability to provide innovative services, applications, content, and devices to consumers. The Commission need not banish the current vertically-integrated business models that predominate today. All it needs to do is crack open the door for new entrants to get established and attempt to win consumer acceptance of their products and ideas. It is that opportunity that is currently lacking and that the Frontline Plan would provide, thereby inoculating the wireless market against the disease of oligopoly.

**B. Competition, Innovation, and Broadband Deployment Are Threatened by Market Concentration and Consolidation.**

**1. The Wireless Market Is Concentrated.**

The wireless industry is rapidly consolidating. Transactions in the last 5-6 years — exemplified by the Sprint/Nextel and Cingular/AT&T mega-mergers — have fundamentally and structurally altered the richly competitive landscape of the late 1990s by removing both national and mid-sized competitors from the market. The result is that the wireless market has become highly concentrated and grows more concentrated with each passing year.

The evidence of market concentration is well-documented in the Commission's *CMRS Competition Reports*. These reports clearly demonstrate that the once-competitive wireless market has evolved into an entrenched oligopoly that is increasingly trending toward duopoly. Indeed, the *trends*, which show no signs of abating, are arguably more troubling than the underlying data itself. To take just a few examples, consider the consolidation of wireless



subscribership over the past decade. In 1997, the top two wireless carriers served approximately 21% of all subscribers, while the top five served 48%.<sup>10</sup> In 2005, by contrast, the top two carriers served 50% of all subscribers, while the top five percent served 88%.<sup>11</sup> At the same time, the number of national wireless carriers has dropped from six to four, with the top two — AT&T and Verizon Wireless — accounting for nearly two-thirds of all new subscribers.<sup>12</sup> Finally, the Commission’s most recent *CMRS Competition Report* found that the wireless industry’s HHI index, measuring market concentration, was 2700, up from 2450 in the previous year alone.<sup>13</sup> To put this in context, the Department of Justice’s Antitrust Division classifies any market with an HHI index above 1800 as “highly concentrated.”<sup>14</sup>

Consumers will feel, and are already feeling, the harmful effects of this market concentration. Increased concentration results in less competition and a greater tendency for current market participants to resist innovative technologies that might threaten their current revenues. Professor Timothy Wu recently documented examples of these very trends, which stem from the industry’s concentration.<sup>15</sup> These examples include:

- Limiting the types of devices that can be used on the closed wireless networks;

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<sup>10</sup> See, e.g., Fourth Report, *Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services*, FCC 99-136, at Tables 1, 4 (1999) (“*Fourth CMRS Competition Report*”).

<sup>11</sup> *Eleventh CMRS Competition Report*, at Tables 1, 4.

<sup>12</sup> *Merrill Lynch Research Report*, at 3.

<sup>13</sup> *Eleventh CMRS Competition Report*, at ¶¶42-47.

<sup>14</sup> See United States Department of Justice & Federal Trade Commission, “Horizontal Merger Guidelines,” at §1.5 (“The Agency regards markets in this region [i.e., above 1800] to be highly concentrated.”).

<sup>15</sup> Timothy Wu, “Wireless Net Neutrality: Cellular *Carterfone* and Consumer Choice in Mobile Broadband,” Working Paper #17, *New America Foundation* (Feb. 2007).

- Blocking or crippling device capabilities such as call timers, Bluetooth technology, and file transfer capabilities; and
- Offering extremely limited broadband services and restricting use of certain applications.

Professor Wu's examples illustrate in extensive detail how national wireless carriers have stifled innovation by imposing severe restrictions on wireless devices and technology. By disabling or crippling functions such as Bluetooth, carriers are also limiting technologies and services that could give rise to vibrant secondary markets.

Another example of these innovation-suppressing practices is provided by Verizon's terms of service for data features included in its wireless broadband service. Buried in the wireless carrier's fine print are examples of the limits that Verizon currently imposes on consumers:

#### DATA PLANS AND FEATURES

Data Plans and Features (such as NationalAccess, BroadbandAccess, GlobalAccess, Push to Talk, and certain VZEmail services) may ONLY be used with wireless devices for the following purposes: (i) Internet browsing; (ii) email; and (iii) intranet access (including access to corporate intranets, email, and individual productivity applications like customer relationship management, sales force, and field service automation). **The Data Plans and Features MAY NOT be used for any other purpose. Examples of prohibited uses include, without limitation, the following: (i) continuous uploading, downloading or streaming of audio or video programming or games; (ii) server devices or host computer applications, including, but not limited to, Web camera posts or broadcasts, automatic data feeds, automated machine-to-machine connections or peer-to-peer (P2P) file sharing; or (iii) as a substitute or backup for private lines or dedicated data connections.**<sup>16</sup> (emphasis in original).

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<sup>16</sup> Verizon Wireless data plan terms of service may be found on the website by selecting any plan that has a data component, for example:  
<http://www.verizonwireless.com/b2c/store/controller?item=planFirst&action=viewPlanList&sortOption=priceSort&typeId=4&subTypeId=12&catId=449>.

The list of prohibited applications appears directly or indirectly to “include, without limitation” VoIP services, mobile media streaming (other than Verizon’s VCAST service), and, of course mobile photoblogging. This evidence of consumers being denied the ability to use the full range of devices and the spectrum in ways they desire should trouble the Commission. Essentially, output is being reduced to protect the anticompetitive practices of the incumbent providers. It is important to note that Verizon is not alone in these restrictive practices. AT&T, for example, recently raised the ire of consumers — and Chairman Martin — by blocking access to free conference calling services over its network.<sup>17</sup>

Further cause for concern is the reality that the two largest wireless carriers are aligned with major wireline operations. These carriers, therefore, have an incentive to protect not only their entrenched wireless businesses but also their entrenched *wireline* businesses against new devices, new technologies and new services that the 700 MHz spectrum would support in the hands of less encumbered licensees. This same concern prompted the Commission to allocate spectrum to non-wireline entities in the early days of cellular and to allocate spectrum for new PCS entrants that could and did compete with the first-generation cellular operators.<sup>18</sup> In addition, the vertical integration of wireless and wireline assets gives the

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<sup>17</sup> See Paul Kapustka, *FCC Chairman Martin to Telcos: No Blocking Iowa Calls*, GigaOM, May 3, 2007, available at <http://gigaom.com/2007/05/03/fcc-commish-martin-to-telcos-no-blocking-iowa-calls>.

<sup>18</sup> Notice of Proposed Rulemaking, Order on Remand, and Waiver Order, *Amendment of the Commission’s Rules to Establish Competitive Service Safeguards for Local Exchange Carrier Provision of Commercial Mobile Radio Services*, F.C.C.R. 16,639, ¶ (1996) (“[I]n 1981, . . . the Commission amended Part 22 of the rules to provide for the authorization of two cellular licensees in each market — one wireline carrier and one non-wireline carrier.”); See First Report, *Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services*, 10 FCC Rcd 8844, at ¶4 (1995) (“*First CMRS Competition Report*”) (“The duopoly nature of cellular service made it less than fully competitive, however. Therefore, in the (continued...)”).

incumbent carriers control over wireline backhaul, which is an essential facility for most wireless carriers.

Another serious manifestation of anti-competitive concentration in the wireless market is roaming impediments. Roaming has become an urgent problem for mid-sized and rural carriers and their customers.<sup>19</sup> As wireless service has gone “national,” wireless customers increasingly demand nationwide capabilities from their carriers. Roaming — and the nationwide capabilities it enables — is therefore essential to the continuing financial viability of mid-sized and rural carriers. These smaller carriers, however, are increasingly forced to rely on a dwindling number of national carriers for roaming agreements — national carriers who no longer have a reciprocal need for roaming arrangements with regional or local carriers.<sup>20</sup> And when one layers on the fact that the largest national carriers — AT&T/Cingular and Verizon — use different technologies, the national roaming options for a particular rural carrier often boil down to one. Without prompt access to more competitive roaming options, rural and mid-sized carriers will continue to be taken out by the larger carriers, further concentrating an already-concentrated market.

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early 1990s, the Commission allocated 143 MegaHertz (‘MHz’) of spectrum, almost three times the spectrum allocation for cellular service, to create Personal Communications Services”).

<sup>19</sup> See, e.g., Comments of Leap Wireless International, Inc., *Reexamination of Roaming Obligations of Commercial Mobile Radio Service Providers*, WT Docket No. 05-265 (Nov. 28, 2005) (“[L]ack of roaming partner choices is a major structural problem within the CMRS industry, and correspondingly, a major problem for smaller and regional wireless carriers and their customers.”).

<sup>20</sup> See *RCR News*, “AT&T Mobility ends eastern Texas roaming agreement,” (May 22, 2007) (“AT&T Mobility ended a roaming agreement with regional wireless operator Cellular One of East Texas. . . . ‘[T]he need for roaming partners is sometimes diminished because of the increasing ubiquity of our network,’ said AT&T spokesman Mark Siegel, who confirmed that the company no longer has a roaming agreement with Cellular One of East Texas”).

In sum, the wireless industry is becoming increasingly concentrated, and that trend is accelerating. This concentration is leading to decreased innovation and consumer choice, and will continue to do so unless and until the Commission implements pro-competitive policies for the 700 MHz auction.

## **2. The Broadband Market is Concentrated.**

The market for broadband access is even more concentrated than the wireless market. In the most competitive areas, today's broadband market consists of an incumbent cable/DSL duopoly, and many service areas lack even these limited choices. As the Commission has documented, the overwhelming majority of all broadband consumers obtain access from their incumbent cable or telephone company.

Broadband access concentration poses a serious threat to the competitiveness of the American economy. The most recent report from the Organization for Economic Cooperation and Development (OECD) shows America trailing in the global race to adopt broadband.<sup>21</sup> Although the United States was once the worldwide leader, it has now fallen to fifteenth in broadband subscribership by percentage of population. The OECD report also found that the United States is falling behind in terms of new subscriber growth. Although reasonable people may differ on how broadband penetration should be measured, no one can be satisfied with the state of broadband in the U.S. Particularly in rural and low-income areas, broadband deployment continues to be slow and uneven, thereby threatening these areas' economic viability.

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<sup>21</sup> Organisation for Economic Co-operation and Development, "OECD Broadband Statistics to December 2006" (2007) ("*OECD Report*"); see also *Broadband Business Forecast*, "Experts Bemoan, Politicos Ponder U.S. Broadband Shortfall," (May 1, 2007) ("The United States has slipped to 15th place in broadband penetration, down from 12th place, according to newly released statistics from the Organisation for Economic Co-operation and Development.").

Like the wireless market, the broadband access market exhibits daunting barriers to entry that prevent these problems from being addressed by new entrants. Indeed, barriers to entry are even more pronounced in the broadband access market given the enormous fixed capital costs required to construct broadband access facilities (e.g., digging up sidewalks, installing wires to the home, or building out a 2.5 GHz network). Moreover, offerings that might spur consumer demand for broadband (e.g., VoIP, IPTV) are susceptible to being blocked by concentrated access providers that seek to prevent rival retail services from “riding” on their systems.

Unless the Commission takes appropriate action in this proceeding, these barriers will impede the emergence of robust wireless broadband access services, which many have predicted will evolve into the long-sought “third pipe” that will bring greater competition to this market. This third pipe could make use of multi-band devices operating in higher frequency bands (e.g., 2.5 GHz, AWS, unlicensed metro-area WiFi) for high capacity and at 700 MHz for ubiquitous coverage. The emergence of the third pipe will therefore require pro-competitive decisions by this Commission.

### **3. Concentration in the Wireline Markets Exacerbates Wireless Concentration, Since the Two Are Fusing Together.**

As noted above, the recent consolidation in the wireline market poses significant — and potentially insurmountable — obstacles to the emergence of a wireless third pipe that competes with cable and DSL broadband service. The two largest wireless carriers are now completely part of the two largest incumbent wireline carriers (Verizon and AT&T). Thus, the wireless carriers with the greatest means to create viable, facility-based, broadband alternatives are the very carriers with the least incentive to do so. As Upton Sinclair once said, “It is difficult to get a man to understand something when his salary depends upon his not understanding it.”

For similar reasons, incumbent wireline carriers whose DSL revenues depend upon a lack of meaningful broadband access competition should not be the foundation of the Commission's broadband competition policy.

Wireless broadband stands at a fork in the road, and the Commission will soon decide which path it will follow. Wireless broadband will become either a complementary, adjunct service for incumbent landline broadband or a fully substitutable alternative ushering in meaningful competition. If the Commission fails to take the appropriate steps now, it will ratify the status quo and place the future of wireless broadband in the hands of affiliates of wireline incumbents. The result? Wireless broadband will be nothing more than an adjunct service with some minimal features and no one will "cut the cord" to rely on wireless broadband service. For a glimpse of this future, the Commission need only look at recent trade press articles describing AT&T and Verizon's plans to integrate their wireline and wireless businesses.<sup>22</sup>

**C. Frontline's Plan Provides the Commission with an Opportunity to Address Market Concentration and Consolidation by Creating a Pro-Competitive Environment.**

Frontline's Plan provides the Commission with a once-in-a-generation opportunity to promote competition that will secure innovation and consumer benefits for the future. As outlined in prior filings, Frontline's proposed specific service rules address the urgent problems of consolidation and concentration through market-based policies that both eliminate structural barriers to entry and create the incentives necessary for market competition.<sup>23</sup>

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<sup>22</sup> *Network World*, "AT&T Offers Integrated Wireless and Wireline Plans: AT&T moves closer to fixed-mobile convergence," April 23, 2007; *Network World*, "Verizon to Bolster Wireless Integration, Ready New Managed Services," January 10, 2007.

<sup>23</sup> *See, e.g.*, Frontline Service Rules Comments; Frontline Public Safety Comments and Reply Comments; Ex Parte Letter from John Blevins to Marlene Dortch, WT Docket Nos. 06-150 and 06-169; PS Docket No. 06-229 (March 27, 2007) (attaching proposed service rules).

## **1. Wholesale Service Rules Will Promote Competition and Innovation.**

Frontline's proposed service rules require the E Block licensee to operate as a wholesale network capacity provider: the licensee will build out the network, own and operate the towers and radios, provide transport to the backbone of the Internet, and then sell network capacity to customers on a wholesale basis, as well as to public safety users and critical infrastructure providers. The proposed rule states:

The E Block licensee shall be limited to providing service to public safety users, entities that provide retail service and products to end users, and providers and operators of critical infrastructure as defined in Section 2(4) of the Homeland Security Act of 2002 (incorporating the definition in 42 U.S.C. § 5195c(e)).

Although the wholesale requirement would be limited to a small portion of the upper 700 MHz band, it would nonetheless create significant economic and consumer welfare benefits. Most obviously, the wholesale requirement would eliminate barriers to entry in the wireless and broadband markets by making network services capacity available to a wide range of new and existing market entrants.

As outlined above, one pressing problem faced by aspiring entrants is large network construction costs. Another is the unavailability of spectrum in the future. The lack of access to spectrum is especially problematic given that wireless incumbents have rational incentives to purchase and warehouse spectrum rather than offering wholesale access to current or potential retail competitors. This concern is not limited to new entrants, but also applies to *existing* market participants that are unable to expand or supplement their service offerings because of construction costs. A nationwide coverage network using E Block spectrum that offers wholesale service would address these problems. New or existing market participants could buy wholesale network capacity and enter the market with a small fraction of the startup capital that would otherwise be required.



Wholesale service of low-frequency spectrum would also support a rich diversity of innovative services that could be used in a variety of ways by many different service providers. Wholesale capacity might be used to support entirely new businesses, or it might be used to supplement “gaps” in existing coverage of current providers. For additional specific examples, consider the following diverse range of business models that could make use of the E Block licensee’s wholesale service, described in the attached paper of Drs. Andrzej Skrzypacz and Robert Wilson:

- a) A small service provider could provide primary service in a smaller geographical area and still offer expanded regional or even nationwide service to its customers. This provider would construct local networks for high demand areas, while relying on coverage from the E Block Licensee in low-demand areas. This business model would intensify competition in high-density areas without requiring the construction of infrastructure in low-average-demand areas.
- b) A startup or an existing small firm that is introducing a new service or wireless product can create innovative devices or services without fear of being blocked by the incumbent providers.
- c) Higher frequency operators (e.g., in the 2.5 GHz bands) can bolster their networks with a low-frequency roaming partner that can more efficiently cover low-density and rural areas.
- d) Unlicensed operators could use licensed spectrum as a “safety net” for in-market services and roaming out-of-market.
- e) Mobile Virtual Network Operator (MVNO) service could become a more viable retail service model.

Further, because the E Block licensee would not use this spectrum for retail operations, it would have no incentive to discriminate or practice anti-competitive behavior against other retail providers. If, by contrast, *incumbent* carriers controlled the E Block spectrum, with no wholesale or open access requirements, they would have strong incentives to discriminate against potential retail customers and services (e.g., VoIP) that threaten their retail

revenues in other markets. In fact, Verizon's EVDO (wireless broadband access service) today prohibits the use of VoIP.<sup>24</sup>

One potential objection to Frontline's proposed wholesale requirement is that the E Block licensee could skirt the spirit of the requirement by either wholesaling its capacity back to a single incumbent or wholesaling capacity back to itself or its affiliate. To address these possibilities, Frontline proposes that the following requirements be included in the proposed service rules to ensure that the wholesale requirement serves the pro-competitive purposes for which it is intended.

First, the service rules would prohibit the E Block licensee from selling more than 24.9% of its total service capacity to any one entity.<sup>25</sup> This prohibition would protect against any one entity dominating use of the E Block network service capacity and preserve the desired wholesale character of the network.<sup>26</sup> In addition, the dedication of at least 25% of the network's service capacity to an open auction system, described in more detail below, would also assure that the E Block spectrum would be used for innovation and open-access uses.

Second, Frontline's open access rules would prohibit the E Block licensee not only from using the network service capacity for its own retail services but also from selling it to

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<sup>24</sup> See *supra* note 16 and accompanying text.

<sup>25</sup> Sales of network service capacity under the open auction concept, described *infra*, would not count toward this limitation.

<sup>26</sup> It is necessary and desirable to permit the E Block licensee to wholesale some of its network service capacity (up to 24.9% per carrier). In the first place, even the largest incumbents have holes in their service area which it would be in the public interest to help fill. In the second place, the four largest carriers serve approximately 83% of wireless users. Therefore, if the Frontline Plan is to provide services that benefit the public, via the wholesale route, it can reach the vast majority of the public only by providing network services to incumbents, including the largest ones. Third, if wholesaling some portion of network service capacity to existing carriers helps sustain the network that creates public safety and wholesale, equal-access benefits, this practice should not be discouraged.

affiliated third parties. Various definitions of “affiliated” parties would achieve this goal. The Commission could, for instance, use its own definition that is applicable under its multiple ownership rules for broadcasting.<sup>27</sup> Under this definition, any entity that is under common control with the E Block licensee would be considered an affiliate. So would any entity in which, directly or indirectly, the E Block licensee had a combined debt/equity interest of 33% or greater.

## **2. Open Access Rules Promote Competition and Innovation.**

For entrepreneurs in the wireless and broadband markets, access to consumers is absolutely essential. Without some confidence that innovators can reach consumers, they will be unable to obtain funding for the innovative services and products they are dreaming up in American garages and college dorm rooms. Recognizing the value of assured access, Frontline’s proposed service rules embrace open access requirements that will promote competition by spurring innovation and unleashing entrepreneurial forces. In short, Frontline’s rules would open a discrete portion of the spectrum and create the incentives and market structure in which innovation and competition would thrive and flourish.

Specifically, Frontline’s service rules promote two critical open access goals: (1) freedom to access services, content, and applications and (2) freedom of equipment choice. The proposed rules provide:

The E Block Licensee shall be prohibited from blocking users from accessing services or content provided by unaffiliated parties, or otherwise engaging in unreasonable discrimination against such services or content, except with the consent of the user or as required by law. The E Block Licensee shall offer on a reasonable and non-discriminatory basis network quality-of-service

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<sup>27</sup> See, e.g., 47 C.F.R. §73.3555.

capabilities to Internet content, application, and service providers. The requirements of this paragraph shall apply to all licenses owned or controlled by the E Block licensee.

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The E Block Licensee may not block the connection of any terminal equipment to the network provided that the terminal equipment complies with specifications published and filed with the Commission by the E Block Licensee, except that such terminal equipment shall not cause harm to the network or to uses of the network.

These open access requirements will generate significant economic benefits by decoupling the retail layer from the connectivity layer. For example, open access policies provide one important benefit by reducing barriers to entry in ways similar to the wholesale service requirement. As noted above, capital investment for new applications or services will be depressed if their providers lack certain access to customers or can obtain access only from incumbent providers with rival retail services. By decoupling the connectivity and retail layers and eliminating the ability *and incentive* to discriminate, Frontline's service rules ensure access to customers while simultaneously providing greater certainty for capital investment, innovative services, and risk-taking.

In addition, open access policies embracing freedom of equipment choice will promote competition and innovation in the wireless technology and devices market. Largely because of the incumbent carriers' restrictions, the wireless devices available to American consumers offer a mere fraction of their capabilities. These restrictions are part and parcel of the incumbent carriers' business plans to limit choice and are antithetical to Frontline's open access policies. A recent *Wired* article discussing the upcoming 700 MHz spectrum auction captured this approach:

Apple's iPhone may be the most eagerly awaited gadget of the year, but when it finally goes on sale some time next month, only

30 percent of US mobile phone customers — those who subscribe to AT&T’s wireless service — will be able to use it. Verizon subscribers might have had a shot, but executives at that carrier nixed the idea of letting an Apple device onto their network years ago. It’s as if Mac owners had to connect to the Internet through AT&T because their machines wouldn’t work on Verizon, Comcast or Time Warner Cable. The wire-line Internet doesn’t work that way, and wireless doesn’t have to either.<sup>28</sup>

But today, this is precisely how wireless works because wireless carriers dictate the types of devices and functionalities that can be used on their proprietary networks. This is exactly how the wireline world worked prior to *Carterfone*. However, after *Carterfone* unleashed American entrepreneurs, the results have been staggering. The technology market witnessed dizzying and unprecedented innovation — fax machines, modems, online services. These productivity-enhancing devices were not immaculately conceived; they were the result of specific pro-competitive policies adopted by the Commission.

At the same time, open access policies would not compromise security or public safety in any way. If anything, open access policies would enhance network security by ensuring that providers and public safety users have the freedom to use the security-enhancing applications and services of their choice. In addition, like facilities-based providers in the telephony context, the E Block licensee would comply with applicable CALEA requirements. Further, the use of the E Block spectrum by a service provider would not negate the provider’s obligation to comply with E-911 requirements.

Finally, Frontline’s service rules propose that the E Block licensee adopt open access policies not only on the E Block spectrum, but on any other licensed spectrum it holds.

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<sup>28</sup> Frank Rose, *Wired*, “It’s Silicon Valley vs. Telcos in Battle for Wireless Spectrum,” (May 16, 2007).

The rationale for extending this requirement is clear: it prevents potential anti-competitive behavior. If the winner of the E Block spectrum holds other spectrum, it will be incentivized to offer consumers a single service or device that will work on multiple bands. If the open access rule does not apply to all bands held by the E Block licensee, then the carrier could easily push consumers to other bands and tell them their devices are non-compliant. Consumers would not know (nor should they care) which band they are using, but a licensee acting strategically and in its best interest could readily defeat the purpose of the open access requirements imposed on the E Block license.

**3. The E Block Licensee Should Be Required To Offer An Open Auction Service On At Least 25% Of Its Commercial Network Capacity.**

At its most innovative, the wholesale structure would enable retailers and other wireless users to acquire spectrum in real time anywhere according to their needs. Such an efficient market in spectrum has long been dreamed of, but never achieved. It could, however, be realized with an E Block allocation that is subject to encouraging service rules.

Accordingly, the E Block licensee should be required to implement promptly an open auction communications service, along the lines of the commonly-used auctions operated by eBay or Google. Under this type of open auction system, device makers and competitive service providers, who may wish to buy blocks of network service capacity in certain geographic markets, would compete for the purchase of E Block service capacity at whatever times, in whatever amounts and for whatever geographic areas serve their particular needs.<sup>29</sup> Thus, the price of the network service capacity being bid for would be set on a daily or periodic basis by

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<sup>29</sup> See also Ex Parte Letter from Richard Whitt, Counsel to Google Inc., to Marlene Dortch, WC Docket No. 06-150; WC Docket No. 06-129; PS Docket No. 06-229; WT Docket No. 96-86 (May 21, 2007).

the market, unlike the long term contracts which characterize the wireless market today. As a result, auction prices would move competitively based on supply and demand at any given time and for any given geographic area. Moreover, these prices would be transparent. The open auction would also be a substantial improvement over the incumbents' service contracts, which generally lock in consumers in long-term contracts with punitive termination fees. If consumers could instead obtain ready access to more open wireless services from providers with no incentive to discriminate, the resulting competition would have a dramatic and enhancing effect upon the entire market.

The network service capacity devoted to open auctions would be subject to the same open access principles that govern the rest of the E Block spectrum. The service rules would require the E Block licensee to dedicate at least 25% of the E Block spectrum to open auctions. The requirement should remain in place for three years in order to give the concept a reasonable chance to succeed and to provide the Commission and the private sector sufficient time to evaluate the performance and potential of open auctions. Toward that end, the E Block licensee should be required to make written reports to the Commission annually that would evaluate the plusses and minuses of these open auctions.<sup>30</sup>

#### **4. Roaming Rules Will Promote Competition, Innovation and Rural Coverage.**

One of the most common and consistently cited concerns of mid-sized and rural carriers is the lack of meaningful roaming options.<sup>31</sup> Frontline's proposed service rules address

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<sup>30</sup> This requirement is similar to the one imposed on experimental licenses.

<sup>31</sup> See, e.g., Comments of Leap Wireless International, Inc., *Reexamination of Roaming Obligations of Commercial Mobile Radio Service Providers*, WT Docket No. 05-265 (Nov. 28, 2005) ("[L]ack of roaming partner choices is a major structural problem within the CMRS (continued...)")

this urgent problem by requiring the E Block licensee to provide roaming to requesting CMRS carriers. The rule provides:

The E Block licensee shall provide roaming service to any requesting CMRS operator whose customers are using compatible equipment. The [open access] requirements of paragraphs (3) and (4) shall not apply to such roaming services.

Frontline's proposed wholesale roaming requirement will promote and protect competition by enabling mid-sized and rural carriers to remain viable wireless competitors in a concentrated market. As explained above, modern wireless services are expected to provide nationwide capabilities. The ability to enter competitive roaming agreements is thus critical for the future of wireless competition on the national, regional, and local levels. In some instances, roaming agreements allow those carriers without a full national footprint, such as T-Mobile and Sprint/Nextel, to fill out their national coverage. In other instances, nationwide roaming capability allows smaller carriers to be viable competitors to nationwide carriers by allowing them to offer "national" service to customers in their home service area. Frontline's service rules will thus promote CMRS competition on all of these levels. In particular, because the E Block licensee will provide wholesale service, it will have maximum incentives to make roaming available to a variety of retail providers. These incentives are quite different from those of incumbent wireless carriers who have incentives to protect their own rival retail services and limit access to spectrum.

In addition, by providing a guaranteed roaming partner, Frontline's service rules will assure greater security and incentives for capital investment and spending in local and

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industry, and correspondingly, a major problem for smaller and regional wireless carriers and their customers.").



regional competition, another strong concern for existing CMRS carriers.<sup>32</sup> For instance, a guaranteed roaming partner might convince a new company to enter a local market.

Alternatively, it might encourage mid-sized carriers to expand existing facilities and services. In any event, the addition of a national, wholesale-only roaming competitor will bring roaming prices down for all mid-sized and small carriers (and thus for their customers).

## **II. THE E BLOCK RULES MUST ENABLE A NATIONWIDE, INTEROPERABLE NETWORK FOR PUBLIC SAFETY COMMUNICATIONS.**

The public record in these proceedings shows that the public safety communications systems in this country have reached the point of crisis.<sup>33</sup> These communications systems are not interoperable, and they put courageous first responders (and all who depend upon them) in danger. The Commission has a critical opportunity and obligation to use its spectrum allocation authority in the upper 700 MHz band – the last available band in the near future – to provide public safety with essential broadband wireless communications tools.

In order to make certain that the public safety community receives the nationwide, interoperable broadband network it so urgently needs, the Commission itself has recognized that it must adopt rules to ensure the creation of a public/private partnership between an upper 700 MHz commercial licensee and public safety. The Frontline Plan, through appropriate changes to the Commission's service and auction rules, would ensure that such a network is built via a public/private partnership by overcoming the two principal obstacles that have hindered such a network: insufficient funding and a spectrum shortfall. As Reps. Jane Harman (D-CA) and Chip

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<sup>32</sup> In NTCA's most recent wireless survey of its members, roughly half responded that obtaining financing for wireless projects was "very difficult" or "somewhat difficult." Comments of the National Telecommunications Cooperative Association, WT Docket No. 07-71 (May 7, 2007) (attaching NTCA 2006 Wireless Survey Report).

<sup>33</sup> See Section II.A *infra*.

Pickering (R-MS) recently noted in a letter to the Commission, the Frontline Plan “presents the federal government with one of the last opportunities to create a single, national system to help public safety agencies achieve seamless operability and interoperability.”<sup>34</sup>

The alternative is a continuation of the balkanized and fragmented emergency communications landscape that leaves public safety officials with communications tools less sophisticated than are available to the average high school student. The Commission should no longer be deterred by the hollow claims of parties who advocate waiting for federal funding or a vaguely defined public/private arrangement that may or may not materialize at some indeterminate point in the future. The public safety community and the rest of the country need more than a hope that this network will be built. By adopting Frontline’s Plan and appropriate service rules specifying (1) coverage and other requirements, (2) a mechanism for resolving any potential disputes, and (3) provisions protecting continued public safety service in the event of financial difficulties on the part of the commercial licensee, the Commission can timely deliver a nationwide interoperable network for public safety.

**A. The Commission Has Rightly Recognized That Public Safety Is in Desperate Need of an Interoperable, Nationwide Broadband Network.**

The pressing communications needs of the public safety community and the continuing failure of this country to meet those needs are well documented. As the National Public Safety Telecommunications Council (“NPSTC”) has explained, “current public safety communications operations are: local or regional in nature, complex and difficult, perennially

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<sup>34</sup> See Letter from Reps. Jane Harman and Chip Pickering to the Hon. Kevin Martin, Chairman, FCC, May 17, 2007, at [http://www.house.gov/apps/list/press/ca36\\_harman/May\\_17.shtml](http://www.house.gov/apps/list/press/ca36_harman/May_17.shtml).

under funded and have dangerous delays and disruptions lurking.”<sup>35</sup> Because of these communications deficiencies, “congested public safety channels pervade every urban and suburban area.”<sup>36</sup> Recent tragedies have confirmed that these systems are outdated; they lack interoperability; and their shortcomings threaten lives.

As the Commission has recognized, in order to remedy the current deficiencies in the public safety communications systems, it is necessary to create a nationwide, interoperable broadband network.<sup>37</sup> Frontline agrees with Chairman Martin that the public safety community needs “a truly national, interoperable broadband network,”<sup>38</sup> and, accordingly, commends the Commission for its decision to designate the public safety spectrum for broadband use because this is key to IP-based interoperability.

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<sup>35</sup> *Ex Parte* Letter from NPSTC, WC Docket No. 06-150; WC Docket No. 06-129; PS Docket No. 06-229; WT Docket No. 96-86) (Apr. 17, 2007) (“NPSTC April 17th *Ex Parte*”).

<sup>36</sup> *Id.* See also Written Testimony of Harlin R. McEwen, Chairman, Communications and Technology Committee, International Association of Chiefs of Police, Before the Committee on Commerce, Science and Transportation, United States Senate, February 8, 2007, at 2, *at*: <[http://commerce.senate.gov/public/index.cfm?FuseAction=Hearings.Testimony&Hearing\\_ID=1813&Witness\\_ID=4431](http://commerce.senate.gov/public/index.cfm?FuseAction=Hearings.Testimony&Hearing_ID=1813&Witness_ID=4431)> (“*McEwen Testimony*”) (“Our public safety users who should have the best, most advanced, and most robust capabilities too often must rely on systems that are inadequate for their needs today, much less the expanded responsibilities with which they will continue to be charged in the future.”)

<sup>37</sup> See *Further Notice* at ¶253 (“only through use of broadband networks could public safety leverage advanced commercial technologies and infrastructure to reduce costs and speed deployment, and enable the potential for priority access to commercial networks during emergencies. Accordingly, we believe that only broadband applications consistent with a nationwide interoperability standard should be deployed in the current wideband allocation of the 700 MHz Band”).

<sup>38</sup> Separate Statement of Chairman Kevin J. Martin, *Further Notice*. Similarly, Commissioner Jonathan S. Adelstein rightly stressed the importance of interoperability and the fact that “our nation needs a national interoperable public safety broadband network.” Separate Statement of Commissioner Jonathan S. Adelstein, *Further Notice*.

But a rule that the network, *if built*, shall be nationwide and interoperable is only the first step. As discussed below, the Frontline Plan also proposes service and auction rules that ensure that the public/private partnership will fully fund and construct such a network *and* that the public safety network will have access to sufficient spectrum.

**B. The Frontline Plan Overcomes the Two Principal Obstacles to Creation of a Nationwide, Interoperable Public Safety Network.**

The service and auction rules proposed by Frontline reflect the reality that a public/private partnership is necessary to ensure buildout of an interoperable, nationwide broadband network that will effectively serve the needs of the public safety community. Only through the auction and service rules proposed by Frontline, which incorporate a public/private partnership for public safety *into* the auction mechanism, can our country answer the challenges identified by those on the front line of emergencies, including the Southern Governors Association. These challenges are a lack of funds and a lack of spectrum.<sup>39</sup> While public safety was given some spectrum about a decade ago, this spectrum is not sufficient for the creation of a broadband network. Furthermore, public safety has not been able to use fully its spectrum in the ten years since obtaining it. Thus, the crisis for the public safety community is not only that it lacks the necessary spectrum to build a nationwide, broadband network, but public safety also lacks the ability to build on the spectrum they are given. While a few large cities have been able to construct their own broadband networks, without a comprehensive, nationwide plan, the remainder of the country will be left without a public safety network. Additional spectrum and

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<sup>39</sup> See Letter from the Southern Governors' Ass'n to the Hon. Kevin J. Martin, Chairman, FCC, May 15, 2007 (attaching resolution of the Southern Governors Ass'n recommending that the FCC "[a]pply specific public safety requirements to at least 10 MHz of the spectrum currently scheduled to be auctioned" in the 700 MHz auction).

funding to build a network on this spectrum are crucial to the implementation of the much needed nationwide, interoperable broadband network.

Frontline's Plan will solve both of these challenges by giving public safety access to additional spectrum and funding the buildout of the nationwide, interoperable broadband network. In contrast, if the Commission adopts rules advocated by the wireless incumbents intent on warehousing spectrum for proprietary commercial applications, these obstacles will continue to plague the public safety community for years to come. Accordingly, the Commission should use the upcoming 700 MHz auction to create the necessary public/private partnership. As Harlin R. McEwen, Chairman of the Communications & Technology Committee of the International Association of Chiefs of Police, has stated: "a nationwide public safety network does not exist today and it will not be built if the existing wireless carriers are left to their own devices at auction ... we believe a public/private partnership is necessary."<sup>40</sup> Without service rules that provide for a viable public/private partnership, the network that public safety so desperately needs will not come to fruition.

Public/private partnerships are not a new concept, and they have a proven record of success in other areas of public responsibilities. The United States government has increasingly relied upon these partnerships to satisfy its most important communications needs. Various government entities, including the U.S. Department of Defense, the Pentagon and several intelligence agencies, have agreements with commercial operators to receive essential communications services, including satellite networks. In fact, there has been a drastic increase over the last two decades in the government's reliance on private companies to provide

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<sup>40</sup> Harlin McEwen, *Nationwide Broadband Network to Save Lives*, Wall St. J., Apr. 30, 2007 at A13.

communications services.<sup>41</sup> In this proceeding Frontline has proposed rules to ensure that such a partnership emerges from the auction process.

In addition to public/private partnerships, the federal government has also leveraged both federal and private resources for the creation of products and services for a common social good. At the simplest level, having an emergency lane on a public highway is an example; the asphalt for the lane is paid for by the taxes on trucks, cars, gasoline, etc., but it is poured not just for commercial/consumer use but also for emergency use by first responders. Another example is the Commission's E-rate program, where funds raised by the Commission from telecommunications providers are given to the private sector to build Internet access to classrooms. These funds are then coupled with public school funds. Frontline proposes that the Commission once again couple public and private funds for a common good and adopt Frontline's Plan for the E Block licensee to contract with public safety to build the nationwide broadband network for free, out of private sector funds, but charge a fair price for public safety users.

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<sup>41</sup> See *Ex Parte* Letter from Gerry Waldron, Counsel to Frontline Wireless, LLC, WT Docket Nos. 96-86, 06-150; PS Docket No. 06-229 (Apr. 19, 2007) (In an article discussing this trend, the authors cite to research by a policy analyst in the Office of the Secretary of Defense finding that at the time of "Operation Desert Storm in the early 1990s, commercial satellites provided 20 percent of the Defense Department's capacity requirements," whereas by 2005, private companies satisfied "80 percent of those capacity requirements." See also Sam Silverstein & Gregory Twachtman, *Government Use of Commercial Satellites Will Remain For Foreseeable Future*, Mobile Satellite News, Apr. 4, 2005, available at 2005 WLNR 5333415 ("Silverstein & Twachtman"). As another author has noted, "since the terrorist attacks of Sept. 11, 2001, the U.S. government has become the satellite industry's single largest customer." Andy Pasztor, *Pentagon, Private Firms Set Satellite Partnership*, Wall St. J., Apr. 9, 2007.

## 1. Funding a Multibillion Dollar Network.

Obstacle. Parties focused on the future of public safety communications have consistently recognized that public safety will be unable to obtain sufficient funding for the costs — the large, fixed, up-front costs — that network construction would require. For example, in a recent letter to the Commission, NPSTC emphasized the need for a public/private partnership “to build a nationwide broadband network for all agencies and provide commercial access to finance the network.”<sup>42</sup> And as Reps. Harman and Pickering explained in their recent letter to the Commission urging adoption of the Frontline Plan, even “the additional \$1 billion to be distributed this year is unlikely to result in real, nationwide improvements necessary to avert another catastrophe.”<sup>43</sup>

The reality that public safety confronts is that it will be extremely costly to construct a nationwide public safety wireless broadband network, and the funds must be generated up-front. Evidence in the record shows that these up-front costs could exceed \$15 billion.<sup>44</sup> There has been *no* Congressional appropriation, and for the vast majority of state and

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<sup>42</sup> NPSTC April 17th *Ex Parte*.

<sup>43</sup> See *supra* note 34.

<sup>44</sup> See Written Statement of the Hon. Karen Evans, Administrator for Electronic Government and Information Technology, Office of Management and Budget, Before the Committee on Government Reform, U.S. House of Representatives, Nov. 6, 2003 (“There is insufficient funding in place to solve the nation’s interoperability problem. Cost estimates are commonly estimated at over \$15B and do not always include the costs of retraining, new infrastructure, or essential maintenance of new systems.”), *available at*: [http://www.whitehouse.gov/omb/legislative/testimony/evans/print/031106\\_evans.html](http://www.whitehouse.gov/omb/legislative/testimony/evans/print/031106_evans.html); see also The First Response Coalition, “It’s Time to Talk: Achieving Interoperable Communications for America’s First Responders” (Oct. 2004), *available at*: [http://www.firstresponsecoalition.org/docs/Interoperability\\_White\\_Paper.pdf](http://www.firstresponsecoalition.org/docs/Interoperability_White_Paper.pdf).

local governments, *no* state or local funding to finance these large upfront costs. At the present time, no such appropriation can be expected.

*Frontline's Solution:* Frontline's Plan proposes auction and service rules that would ensure that the E Block licensee will fund the buildout of public safety's nationwide, interoperable broadband network – built to a public safety grade of service – at no cost to public safety or taxpayers. That is, the Frontline Plan would require the winning bidder of the E Block to build out a network for the public safety community and make commercial spectrum available to public safety in times of emergency. In return, the winning bidder would have preemptible access to the network capacity operating over the unused public safety spectrum.

Thus, Frontline's Plan provides competitive alternatives to other network offers that may be made; maximizes use of spectrum for public safety and commercial uses; makes available extra spectrum in emergency situations; and builds the network for free in state-of-the-art, 4G, IP-level configuration. If the Commission adopts the Frontline Plan, it will solve public safety's funding problem by ensuring that the broadband network infrastructure is built with private capital at no cost to public safety. It will relieve public safety agencies of both the construction costs and the time-consuming and difficult task of securing investment.

*Commercial Incumbents and the Status Quo:* Considering the crucial importance of a broadband public safety network and the lack of sufficient funding, calls to simply wait for massive government grants that will transfer taxpayer dollars to incumbent carriers in exchange for building the network should be disregarded. Verizon, for example, has lobbied for the “majority of funds” for the broadband network to “come from public sources,” and argued that



“significant federal funding is required to provide the initial capital.”<sup>45</sup> That did not happen after 9-11. That did not happen after Hurricane Katrina. It is long past the time to talk about what might happen or should happen; it is time for the Commission to clear the way and allow the winner of the E Block to make it happen. Any serious proposal must address how this costly network will be funded and built without government monies. Frontline’s Plan is the only proposal to provide a clear funding mechanism that capitalizes on this crucial opportunity.

In addition to suggesting that the federal government fund the creation of the public safety network, Verizon has also advocated a “go it alone” approach for public safety that relies upon a hope that some unknown party may some day decide to create the network if the price is right.<sup>46</sup> This approach is equally unrealistic. The Commission confronts its one and only opportunity to mandate a newly built fourth generation network on spectrum adjacent to public safety’s spectrum. Relying on incumbents to use existing networks to provide public safety with the necessary services would leave public safety with old technology on commercial grade networks. Only a new entrant has the incentive to build a public-safety grade network, and

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<sup>45</sup> See Verizon Wireless Comments to the Southern Governors' Ass'n Task Force on Achieving Interoperability for Public Safety Communications, (March 16, 2007) (“the need for a dedicated public safety network requires that the majority of funds come from public sources. Significant federal funding is required to provide the initial capital outlay associated with building a nationwide broadband network. Revenues from commercial spectrum auctions can help to generate these funds. State Governors should urge Congress to make more funds available in the near term and should call for a plan that ensures access to sufficient funds over the long term”), *available at*: <http://www.southerngovernors.org/resolutions/InteroperabilityPDF/Verizon%20Recommendations%20to%20SGA.pdf> (“Verizon Southern Governors’ Task Force Comments”).

<sup>46</sup> See, e.g., Letter from John T. Scott, Verizon Wireless to Marlene H. Dortch, PS Docket No. 06-229, Ex. A at 4 (April 4, 2007) (“State Governors should urge Congress to make more funds available in the near term and should call for a plan that ensures access to sufficient funds over the long term”).

only a new network can offer these fourth generation services, not only to consumers but also to public safety.

Of what use is it to say that public safety can contract *later* for a provider to construct its network in exchange for access to spectrum? As NPSTC explained in response to the *Ninth NPRM*, “[w]ithout commercial investment to support the buildout and maintenance of the network, the burden will fall to state and local governments under the pay-as-you-go format. . . [T]his is neither realistic nor achievable.”<sup>47</sup> The Association of Public-Safety Communications Officials- International, Inc. (“APCO”) agreed, stating that “the absence of a clear model for funding is a major concern.”<sup>48</sup> Frontline strongly agrees that it is vital to develop a solution that funds the construction of a modern public safety, interoperable broadband network, provides public safety with access to sufficient broadband spectrum, promotes affordable and flexible equipment choices for public safety, and provides regional and local public safety agencies with the necessary control.

Public safety should not be forced to rely on the highly concentrated incumbent wireless industry whose interests and motives will not be aligned with those of public safety, as recent years have demonstrated. Instead, the Commission should adopt Frontline’s Plan to structure the service and auction rules to attract new entrants and investors willing to make a concrete and enforceable commitment to build and operate an interoperable broadband network for public safety agencies across the country.

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<sup>47</sup> Comments of NPSTC, *Implementing a Nationwide, Broadband, Interoperable Public Safety Network in the 700 MHz Band*, PS Docket No. 06-229, at 8 (Feb. 26, 2007) (“NPSTC Public Safety Comments”).

<sup>48</sup> Comments of APCO, *Implementing a Nationwide, Broadband, Interoperable Public Safety Network in the 700 MHz Band*, PS Docket No. 06-229, at 11 (Feb. 26, 2007) (“APCO Public Safety Comments”).

## 2. Accessing at Least 22 MHz of Spectrum in Times of Emergency.

Obstacle: Public safety must have access to sufficient spectrum for emergency operations, when a public safety network is most necessary and its communications resources most tested. The 10 MHz block designated for public safety broadband use provides the foundational allocation, but the record shows that more spectrum is necessary for the extraordinary demands that are placed on the broadband network during emergencies.<sup>49</sup> As NPSTC noted to the Commission, “assertions that public safety has adequate spectrum are insulated from the reality facing the nation’s emergency services.”<sup>50</sup> The State of California echoed this finding and stated that it does not believe this to be “an adequate amount of spectrum to handle the expected load.”<sup>51</sup> The Spectrum Coalition For Public Safety also found that the spectrum designated for broadband use is “inadequate to satisfy the entire need for public safety.”<sup>52</sup>

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<sup>49</sup> The Public Safety Wireless Advisory Committee, as well as several public safety agencies and private companies, have made clear that more than 12 MHz is necessary for public safety broadband operations. *See, e.g.,* Final Report of the Public Safety Wireless Committee to the Federal Communications Commission and the National Telecommunications and Information Administration, Public Safety Wireless Committee, at 20-21 (Sept. 11, 1996), *available at*: <[http://pswac.ntia.doc.gov/pubsafe/publications/PSWAC\\_AL.PDF](http://pswac.ntia.doc.gov/pubsafe/publications/PSWAC_AL.PDF)>; *see also Spectrum Coalition White Paper* at 4.

<sup>50</sup> Reply Comments of NPSTC, *Implementing a Nationwide, Broadband, Interoperable Public Safety Network in the 700 MHz Band*, PS Docket No. 06-229, at 3 (Mar. 12, 2007) (“NPSTC Public Safety Reply Comments”).

<sup>51</sup> Comments of the State of California, *Implementing a Nationwide, Broadband, Interoperable Public Safety Network in the 700 MHz Band*, PS Docket No. 06-229, at 2 (Feb. 26, 2007).

<sup>52</sup> Comments of the Spectrum Coalition for Public Safety, *Implementing a Nationwide, Broadband, Interoperable Public Safety Network in the 700 MHz Band*, PS Docket No. 06-229, at 4 (Feb. 26, 2007).

Frontline's Solution. Frontline's Plan addresses the clear need for additional spectrum by more than doubling the amount of peak broadband spectrum capacity available to public safety communications. It does so by requiring the adjacent, commercial E Block licensee to provide priority access to public safety broadband operations on its own 12 MHz of commercial spectrum during emergencies.<sup>53</sup> Consequently, under Frontline's Plan, not only would public safety services have the highest priority access to network capacity operating on the 10 MHz of broadband spectrum allocated to public safety, but when necessary it would also have priority access to the E Block's additional 12 MHz of network service capacity. This network capacity will save lives in times of emergency by allowing police, firefighters and other public safety officials and agencies to effectively communicate with one another whether the interoperable communication occurs within the same small town or from Hawaii to Massachusetts.<sup>54</sup>

Although public safety must have access to far more than 10 MHz during emergencies, it will not fully use its allocated spectrum day-in and day-out and all hours of the day. Thus, Frontline's Plan also makes the most efficient use of spectrum in non-emergency times by allowing the E Block commercial licensee to sell network capacity over the unused public safety spectrum. As the Commission recognized in the *Ninth NPRM*, commercial use of

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<sup>53</sup> The commercial band plan supported by Frontline is described in more detail at Section III, below.

<sup>54</sup> Demonstrating the feasibility and desirability of such sharing, the U.S. Navy has utilized the network capacity provided by commercial operators to "boost capacity on short notice and for limited periods," because the "so-called surge capabilities" offered by commercial entities prevent the government from paying for "space that sits unused much of the time just in case a ship happens to need it." See Silverstein & Twachtman at 2.

public safety spectrum on a secondary basis is a viable option.<sup>55</sup> This secondary commercial access will in no way disrupt public safety services, which will always have automatic and unquestioned priority over commercial users with respect to the full capacity of the 22 MHz-wide shared network.

*Commercial Incumbents (Again) Urge the Status Quo:* The parties that have opposed the auction and service rules proposed by Frontline have themselves failed to propose alternatives for solving public safety's spectrum shortfall. Frontline's Plan remains the only viable solution to the problems faced by public safety while simultaneously providing a mechanism to fund the creation of the nationwide, interoperable, public safety broadband network. Throughout the course of this proceeding, the largest commercial carriers have maintained that public safety "has enough" spectrum and the Commission should ignore public safety's need for more spectrum. But the record contains ample evidence that (1) 10 MHz is insufficient for the mobile broadband network public safety needs in times of emergency, and (2) public safety lacks the funding to build such a network even if it had access to sufficient spectrum. As Harlin McEwen stated, "a nationwide [public safety] broadband network solution need[s] to address both spectrum and funding, and to address them both at the same time and in the same context. The latter is just as critical as the former and requires an innovative approach given the costs associated with building and operating a truly nationwide broadband network."<sup>56</sup>

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<sup>55</sup> *Implementing a Nationwide, Broadband, Interoperable Public Safety Network in the 700 MHz Band; Development of Operational, Technical and Spectrum Requirements for Meeting Federal, State and Local Public Safety Communications Requirements Through the Year 2010*, Ninth Notice of Proposed Rulemaking, 21 FCC Rcd 14837 (2006) ("Ninth NPRM") at ¶¶19, 41-46.

<sup>56</sup> McEwen Testimony at 6.

Frontline’s Plan does just that: it provides the public safety community with additional spectrum and clearly sets forth how the network should be funded.

**C. Frontline’s Proposed Rules Ensure That the Shared Network Will Serve the Communications Needs of Public Safety.**

Frontline’s proposed rules will ensure that the public/private partnership between the E Block licensee and the public safety community will effectively serve the needs of the public safety community. In addition to the key tenets of Frontline’s Plan discussed above – the free buildout of the nationwide, interoperable broadband network for public safety and access to additional spectrum for high-capacity emergencies – Frontline also proposes that the Commission adopt service rules to address the following public safety issues: (1) enforceable buildout standards for nationwide coverage; (2) the public/private network sharing agreement; (3) preventing discontinuance of network service; and (4) freedom of equipment choice. Adopting Frontline’s proposed rules will ensure a successful public/private partnership between public safety and the E Block licensee.

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Frontline’s proposed shared network should also greatly benefit critical infrastructure providers, like power, electric and water providers, whose services obviously are of great importance at all times and especially during emergencies.<sup>57</sup> Accordingly, these providers require a robust network of the kind that public safety needs and that the E Block

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<sup>57</sup> The Commission defines critical infrastructure as “state, local government and non-government entities, including utilities, railroads, metropolitan transit systems, pipelines, private ambulances, volunteer fire departments, and not-for-profit organizations that offer emergency road services, providing private internal radio services provided these private internal radio services are used to protect safety of life, health, or property; and are not made commercially available to the public”). 47 CFR §90.7.

licensee will have to build to meet those needs.<sup>58</sup> The E Block licensee should consult initially and on an ongoing basis with representatives of the critical infrastructure industry to take into account their special equipment and operational requirements. Further, the requirements preventing discontinuance of service by the E Block licensee without prior Commission consent should apply not only to the public safety community, but to critical infrastructure providers as well.

### **1. Enforceable Buildout Standards for Nationwide Coverage.**

Frontline proposes that the Commission adopt an aggressive buildout schedule for the E Block license. The design and construction of a nationwide, interoperable broadband network for such an ambitious coverage target requires a very large investment. Nonetheless, Frontline proposes interim milestones culminating in service to 99% of the U.S. population within ten years after the E Block license is issued or the spectrum is made available, whichever is later.

Specifically, the E Block licensee would provide coverage to:

- 75% of the U.S. population (or equivalent geographic coverage)<sup>59</sup> within four years;
- 95% of the U.S. population (or equivalent geographic coverage) within seven years; and
- 99% of the U.S. population (or equivalent geographic coverage) within ten years.

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<sup>58</sup> In fact, the public utilities have recognized this need and, consequently, have built robust communications facilities aimed at maximizing the reliability of their services under all conditions. The network built by the E Block licensee would, therefore, be entirely suitable for these services.

<sup>59</sup> Geographic coverage would include CONUS and Hawaii, all exclusive of federal land. Of course, Indian lands would be included.

In addition, in recognition of its large but sparsely populated geography, the state of Alaska would receive an extra measure of coverage protection. All Alaskan towns with 5,000 or more population would have to be covered within four years and the E Block licensee would be required to work with the Alaska Land Mobile Radio Project to formulate a plan appropriate to Alaska's unique coverage challenges.<sup>60</sup>

Frontline's proposal for a very high, population-based (or equivalent geographic) coverage requirement serves the essential goal of a public safety network in not merely serving population centers, but also more sparsely populated areas. Emergencies can and do occur in outlying towns and rural areas, just as they do in urban centers. Because of these considerations, which Frontline has discussed extensively with the public safety community and government officials including the Commission, Frontline is now proposing a ten-year population coverage of 99%.

Unlike other public/private partnerships that have been proposed in the recent past, only the Frontline Plan provides an enforceable buildout schedule. One could propose an even higher buildout target (as Cyren Call did), but without a schedule, it has no teeth. Frontline's coverage proposal will ensure that, unless public safety agrees to a less demanding requirement (after all, the public safety community also has a vital stake in the health of the shared network) or other compelling circumstances emerge, public safety's broadband network will provide coverage to 99% of the U.S. population within 10 years after the E Block high bidder receives its license and its spectrum is cleared.

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<sup>60</sup> This population coverage requirement for Alaska would apply under either the proposed population-based measure or an alternative geographic approach.



## **2. Public Safety Control at the Local Level.**

Second, local agencies will have control over their use of the network.

Frontline's Plan recognizes the importance of ensuring that local and regional agencies maintain total "command and control" over their own local networks during emergencies. It, therefore, requires the E Block licensee to use modern, IP-based technology that enables nationwide, statewide, and local "logical" public safety networks that can operate within the same spectrum and subject to each entity's local control. This technology will — and must — allow these agencies to create secure virtual private networks or Intranets that would be controlled by the local or regional public safety agencies to ensure their security. Through this technology, local agencies will have control over what devices are able to access their network and which applications individual users may access.<sup>61</sup>

## **3. Network Sharing Agreement Between the National Public Safety Licensee and the E Block Licensee.**

Frontline also agrees with public safety groups, like NPSTC, who stress that the public safety community should participate in administering the nationwide public safety network and that public safety must maintain control over the spectrum allocated to it by Section 337.<sup>62</sup> Under Frontline's Plan, public safety participation would be essential to the success of both the buildout and operation of the public/private network. Accordingly, Frontline agrees that

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<sup>61</sup> Recognizing that some local agencies and governments may have the need and funding either to build out in uncovered areas or to accelerate buildout, the E Block licensee and the National Public Safety Licensee (NPSL) should develop a process for working with local agencies or the Regional Planning Commissions so that a broader coverage national network can be built out sooner. For example, if a jurisdictional area such as a county wants to finance an early or additional buildout, the E block licensee could reach a mutual agreement with that entity concerning that part of the network. The E block licensee would work with the funding party and the local public safety entity to develop the buildout schedule that takes into account other commitments of the E block licensee.

<sup>62</sup> See NPSTC April 17th *Ex Parte*.

the Commission's rules should direct the E Block licensee and National Public Safety License ("NPSL") to execute a network sharing agreement.<sup>63</sup> The Network Sharing Agreement would include provisions to ensure that the network is built to public safety standards, including requirements on reliability, redundancy and restorability. The NPSL's continuing role on the other side of the bargaining table from the E Block licensee will give the public safety community substantial authority over the development and operation of the shared network. Certainly, the NPSL licensee will be far more powerful and effective than any single public safety agency could be.

Frontline's Plan situates public safety in an advantageous position to effectively negotiate a network sharing agreement and coordinate with the E Block licensee with respect to the network's ongoing operation. The Plan enables the parties to negotiate mutually beneficial arrangements because each party stands to gain a great deal by the participation of the other and to lose a great deal if they fail to agree. Public safety deserves a state-of-the-art, 4G network with access to substantial additional capacity in times of emergency. Under Frontline's Plan, the E Block licensee will build this network for the public safety community and give it immediate access to the necessary additional spectrum in times of emergency. The E Block licensee will treat public safety as the core user of the network. Further, the E Block licensee will benefit from secondary access to unused capacity on public safety's broadband spectrum. With both the E Block licensee and the public safety licensee having so much to gain from reaching an agreement, they will reach a mutually satisfactory agreement that will continue to adapt to changing needs, technologies and other developments. Moreover, in these negotiations public

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<sup>63</sup> See *Further Notice* at ¶¶281-83.

safety will be protected by important safeguards for public safety's interests that will already have been included in the Commission's rules.

As a last resort, if these incentives and conditions do not result in a mutually beneficial network sharing agreement, Frontline supports the Commission's proposed two-fold approach requiring an executed network sharing agreement before the license will be issued to the E Block licensee, but accompanying this requirement with a provision for binding alternative dispute resolution ("ADR") by the Commission.<sup>64</sup> This approach avoids giving either party a "veto" over establishment of the crucial, public/private network for innovation and public safety communications, but, importantly, incentivizes the E Block licensee to reach a mutually beneficial agreement with the NPSL in a timely manner.

This proposal also maintains the Commission's non-delegable duty to decide license qualifications, rather than placing it in the hands of a third party, the NPSL. To allow the NPSL to decide whether the E Block license should issue to the otherwise qualified winning bidder would violate the Commission's statutory licensing responsibility.<sup>65</sup> Such a provision would also understandably deter investment in applicants, like Frontline, which will need to raise funds first to bid and then to construct and operate the shared network.

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<sup>64</sup> The Commission has proposed a binding ADR provision in the event of an impasse. *See Further Notice* at ¶282.

<sup>65</sup> *United States Telecom Association v. FCC*, 359 F.3d 554, 566 (D.C. Cir. 2004) ("[S]ubdelegations to outside parties are assumed to be improper absent an affirmative showing of congressional authorization."); 47 U.S.C. § 301 (purpose of Communications Act "to maintain the control of the United States over all the channels of radio transmission"); *id.* at § 303 (establishing Commission authority over the grant of licenses); *id.* at § 309(j)(1) ("[T]he Commission shall grant the license or permit to a qualified applicant through a system of competitive bidding"); *id.* at § 309(j)(5) ("No licenses shall be granted to an applicant pursuant to this subsection unless *the Commission* determines the applicant is qualified....") (emphasis in both added).

Also, because the Commission's arbitral role would be governed by the principles described herein and would involve two parties incentivized to reach a single agreement, any Commission arbitration would likely be focused on only a few sharply defined issues. By its nature, this dispute resolution process would be markedly different from what has occurred, for example, in the 800 MHz reconfiguration.<sup>66</sup> There, *hundreds upon hundreds* of individual public safety agencies and Sprint Nextel Corp. have had to negotiate many frequency relocation agreements, and that process has been complicated by competing incentives as to how to define a "comparable facility" between parties who, once agreement is reached, need never interact again.<sup>67</sup> Negotiating so many "one-off" agreements requires a comprehensive process and system, unlike a simple disagreement between two parties who need to have an ongoing relationship.<sup>68</sup>

One of the most important aspects to be covered by the network sharing agreement is pricing of public safety's use of the shared network. Pricing should be set according to fair and reasonable principles which take account of a number of factors, including:

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<sup>66</sup> See [www.fcc.gov/pshs/spectrum/800mhz/bandreconfiguration/overview.html](http://www.fcc.gov/pshs/spectrum/800mhz/bandreconfiguration/overview.html) for an overview of the 800 MHz rebanding process.

<sup>67</sup> See, e.g., *Public Safety Groups Say Scarce Dollars Wasted on Rebanding Fights*, Comm. Daily, May 11, 2007 (Quoting a Sprint spokesperson as stating that the negotiation process "requires Sprint to ensure that every dollar spent on band reconfiguration complies with the FCC's minimum cost standard"); Letter from APCO *et al.* to Catherine Seidel, FCC, Jan. 12, 2006 (complaining of delay in the reconfiguration process and citing "demands from Sprint Nextel that licensees provide extraordinarily detailed cost estimates").

<sup>68</sup> The two-party negotiation between the NPSL and the E Block licensee would also not be subject to the dearth of information that reportedly has plagued some public safety agencies in the 800 MHz rebanding process. The NPSL would have full access to information of its constituents. See, e.g., *FCC Lets Public Safety Share Notes on 800 MHz Talks*, Comm. Daily, Jan. 9, 2007 (reporting on the Commission's decision to allow public safety agencies to share information concerning their negotiations with Sprint and reporting the widespread opinion of public safety officials that previously, requirements not to disclose such information were "a major stumbling block to swift progress on 800 MHz rebanding").

(1) public safety's contribution, through the NPSL, of 10 MHz of broadband spectrum to the shared network, which will enable the E Block licensee to offer its commercial wholesale customers additional capacity when public safety capacity is not being fully utilized by public safety; (2) the cost of building and operating a nationwide network; (3) the substantial incremental capital costs of building the shared network to public safety coverage, spectrum bandwidth, reliability, and performance standards compared to less costly commercial standards<sup>69</sup>; and (4) the ongoing cost to the E Block licensee of providing, in effect, a "retail" service to public safety users in comparison to the lower costs of providing wholesale service to its commercial customers.

The latter two factors effectively provide for use of commercial rates as a guide in determining public safety rates. These guideposts would provide public safety with the benefit of the competitive market that will exist in setting wholesale usage fees for commercial customers. As a consequence, the E Block licensee will have no ability to behave as a "monopoly" provider of public safety services, as some parties have suggested.<sup>70</sup> The Commission should require that the E Block licensee charge public safety users at rates no higher than the most favorable rates it charges commercial customers for equivalent services. In

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<sup>69</sup> Public safety's technology, coverage and operational needs for the shared network will be developed in the context of negotiating the shared network agreement. This shows why, among other reasons, decisions about pricing of services for public safety cannot be made until those discussions take place.

<sup>70</sup> Tellingly, these same parties argue that public safety should make do with such 10 MHz of spectrum and that the 700 MHz service and auction rules should do nothing to bring about a nationwide network for public safety communications. *See* Comments of MetroPCS, WT Docket No. 96-86, at 4 (Feb. 26, 2007); Verizon Southern Governors' Task Force Comments, *supra* note 45, at 3-4.

addition, Frontline will give a substantial allowance for public safety's use of the network for urgent communications in recognition of their importance to the community.

#### **4. Preventing Discontinuance of Service.**

The Commission's rules should also protect against any disruption of public safety's use of the network, regardless of the financial health or even bankruptcy of the E Block licensee. Accordingly, the Commission should require the E Block licensee to continue to provide service absent Commission authorization for discontinuation of service. Frontline proposes that the Commission would not permit the E Block licensee to discontinue public safety service until a trustee, the E Block licensee as debtor-in-possession or other reliable party is in place to assume control and maintain operation of the network.

This approach corresponds to the Commission's treatment of carriers regulated under Title II of the Communications Act, who must obtain permission to discontinue service in the same manner as required under Section 214 of the Act and in accordance with rules promulgated thereunder with respect to discontinuance of service by a Title II carrier.<sup>71</sup> The Section 214 process has protected consumers from discontinuance of wireline service even during bankruptcy. Under Section 214, even in the case of bankruptcy, before discontinuing service, providers must petition the Commission for permission.<sup>72</sup>

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<sup>71</sup> See 47 U.S.C. § 214 ("No carrier shall discontinue, reduce, or impair service to a community, or part of a community, unless and until there shall first have been obtained from the Commission a certificate that neither the present nor future public convenience and necessity will be adversely affected thereby"); 47 C.F.R. § 63.71.

<sup>72</sup> "See *Comments Invited on Application of CoreComm New York, Inc. to Discontinue Domestic Telecommunications Services*, 20 FCC Rcd. 18283 (2005) ("CoreComm indicates that it has been in the process of obtaining approval to discontinue service to customers in various locations as part of its emergence from bankruptcy...CoreComm seeks authority to discontinue local, intrastate toll, interstate toll and international services to its remaining customers in New York").

Specifically, Frontline proposes that the Commission adopt a rule at Section 27.16(a)(2) stating that:

The E Block licensee shall not discontinue, reduce, or impair service to public safety users on public safety spectrum, as well as critical infrastructure users on the commercial spectrum, unless and until, pursuant to Commission procedures, it has obtained prior authorization from the Commission.

This rule will ensure that vital public safety communication services would not be disrupted by any potential financial difficulties faced by the E Block commercial licensee.

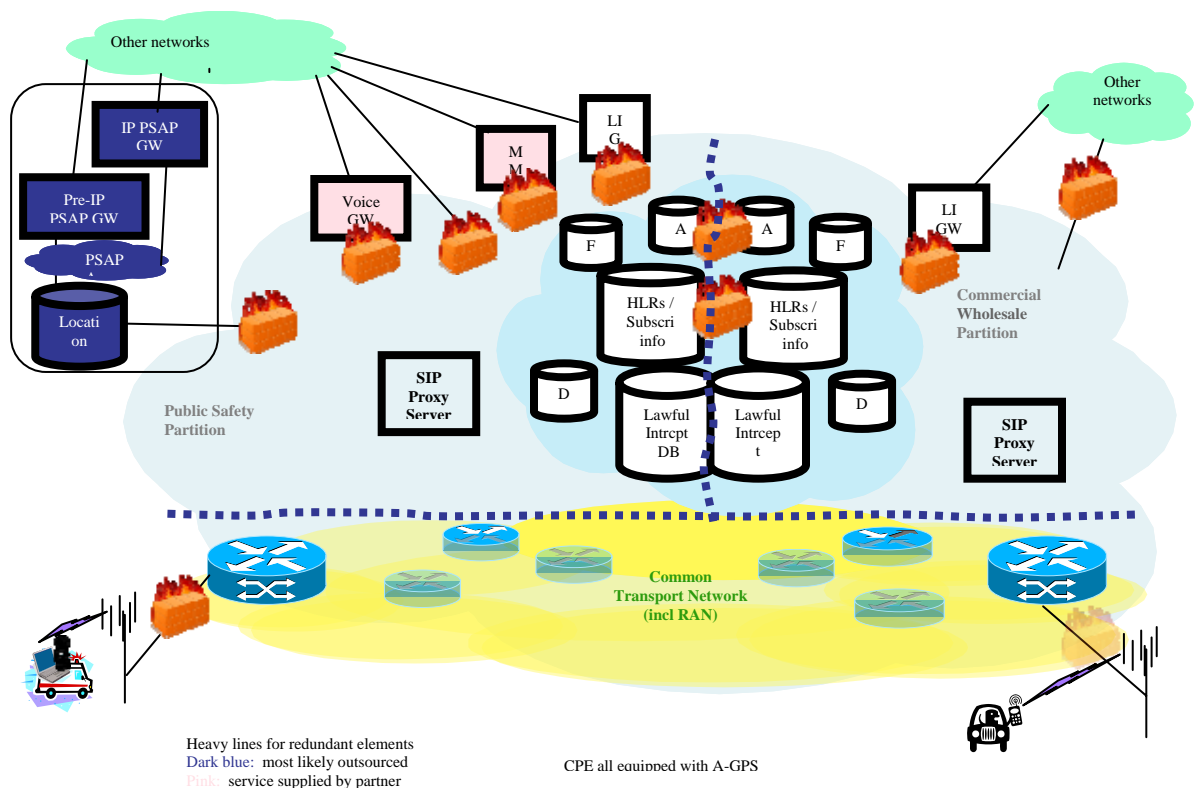
#### **5. Freedom of Equipment Choice.**

The open access nature of the wholesale offerings on the shared network, as described more fully in Section I, will foster innovation to the benefit of not only consumers but also public safety communications. Specifically, open access will dramatically reduce the cost of public safety equipment while simultaneously increasing the availability of such equipment. Public safety agencies have traditionally had no choice but to purchase proprietary, specialized, low-volume equipment designed to operate only on public safety spectrum, and that has increased public safety communications costs. Frontline's Plan would allow public safety agencies to take advantage of affordable, state-of-the-art technology from a variety of vendors in response to their individualized needs. In addition, freedom of equipment choice will spur investment and innovation in the equipment sector as entrepreneurs work to satisfy public safety's unique needs.

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An open access network will not diminish the security of the public safety network. Services to public safety will be provided within a separate partition or service domain as depicted below. Through the inherent capabilities of an IP-network, public safety will have a separate domain with each local and regional agency having their own Virtual Private Networks.

Moreover, the network will provide “layer 2” device authentication using cellular industry standards for 3G and 4G technology. This “public safety partition” will restrict access and networking to only public safety authenticated devices and authorized users, per public safety’s needs. Thus, two levels of authorization and authentication are provided. Furthermore, whether public safety is accessing its own spectrum or the E Block licensee’s commercial spectrum, the security authentication and authorization for access into the public safety partition are identical. The bottom line is that public safety users will always have the benefit of a very high level of security.



#### D. Licensing the Spectrum to Large Incumbent Providers Will Not Solve the Needs of the Public Safety Community.

While it may be true that any incumbent service provider could offer public safety service on their existing networks, history has proven that this is extremely unlikely to happen.



Large providers have had years to choose to provide a solution to public safety's communications needs, but they have failed to do so. Wireless incumbents, such as Verizon and AT&T, own licenses for spectrum in the nearby 800 MHz band and have offered little to the public safety community. Only now, when another party has offered a viable solution to meet public safety community's needs, have the incumbents claimed that they would be able to offer service to public safety. The years of inaction by these incumbents should speak louder than their current suggestions.

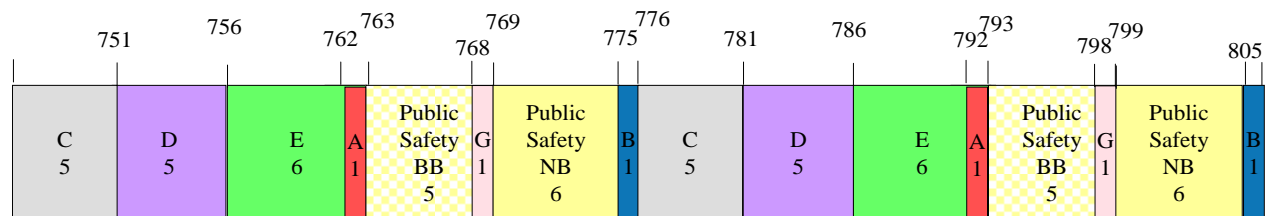
Furthermore, even in the unlikely event that incumbent service providers do decide to offer services to public safety, these incumbents will be unable to offer the same benefits as a new entrant. Only a new entrant, the E Block licensee, will be able to offer all of the following: (1) service on a contiguous network built to public safety standards, (2) pricing that competes with anything offered by the incumbents, and (3) a commitment to maximizing local choice, open access for different handset technologies, and freedom to connect granted to local end users, not imposed upon them by the network proprietor.

Frontline's Plan will not deliver local and regional public safety entities into the hands of a single retail service provider, like Verizon or AT&T. In addition, Frontline's Plan will not lock public safety into a single equipment provider. Rather, Frontline proposes to give public safety open access to a wireless network with maximum choice of handsets and applications.

### III. THE COMMISSION SHOULD ADOPT A BAND PLAN AND AUCTION RULES THAT MAXIMIZE THE CAPACITY OF THE PUBLIC/PRIVATE SHARED NETWORK, MAKE SMALLER LICENSE AREAS AVAILABLE, AND ENABLE OPPORTUNITIES FOR NEW ENTRANTS.

#### A. Commercial Band Plan.

The band plan for the upper 700 MHz band should enable the construction of a robust, public/private shared network to the benefit of wireless innovation and competition as well as robust, interoperable communications for the public safety and critical infrastructure communities. To that end, Frontline recommends that the Commission adopt a modified version of the band plan identified as “Proposal 4” in the *Further Notice* in the manner depicted below:



<u>Block</u>	<u>Frequencies</u>	<u>Bandwidth</u>	<u>Pairing</u>	<u>Area Type</u>	<u>Licenses</u>
C	746-751, 776-781	10 MHz	2 x 5 MHz	RSA/MSA	734
D	751-756, 781-786	10 MHz	2 x 5 MHz	EA	176
E	756-762, 786-792	12 MHz	2 x 6 MHz	Nat'l Broadband	1
A	762-763, 792-793	2 MHz	2 x 1 MHz	MEA	52*
B	775-776, 805-806	2 MHz	2 x 1 MHz	MEA	52*

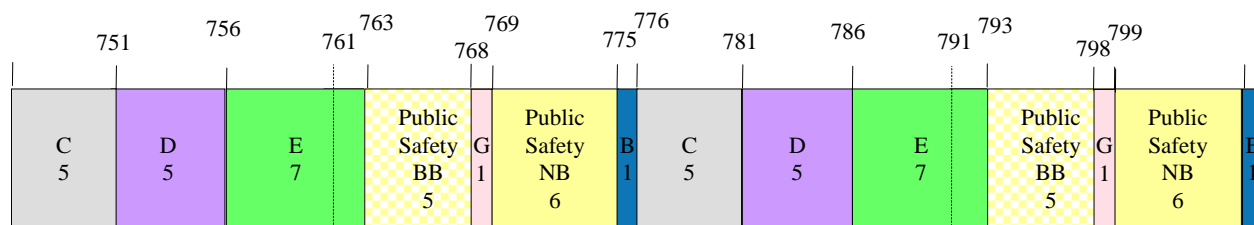
\*Blocks have been auctioned, at different locations in band plan.

When combined with the service rules described above in Section I, the licensing of the E Block for a nationwide area will further the competitive power of wireless entrants, while supporting the critically-needed, nationwide, interoperable public safety network. Without a national license, the goal of interoperability cannot be attained.

*First*, under this band plan, the other two blocks to be auctioned will also further competition in the wireless marketplace. As indicated in the *Further Notice*, the D Block would be auctioned in 176 EAs licenses. Mindful, however, that even EAs may be too large to permit

entry by smaller carriers, Frontline also supports licensing of the C Block in 734 RSA/MSAs. As the Commission has previously noted, “RSAs and MSAs allow entities to mix and match rural and urban areas according to their business plans and that, by being smaller, these types of geographic service areas provide entry opportunities for smaller carriers, new entrants, and rural telephone companies.”<sup>73</sup>

Second, by providing for 2 x 5 MHz-wide C and D Blocks, instead of 2 x 5.5 MHz-wide blocks as described in the version of Proposal 4 provided in the *Further Notice*, this band plan would make efficient use of the spectrum, because channelization in 4G networks is based on 5 MHz-wide channels. 5 MHz-wide channels and multiples thereof are used in the 800 MHz CMRS spectrum, the PCS spectrum, and the AWS spectrum, as well as by most other countries. Therefore, major manufacturers will design technologies that will fit within 5 MHz wide channels and multiples therefore and meet the regulatory obligations for out-of-band emissions. However, with the 2 x 6 MHz-wide E Block adjacent to the 1 MHz-wide A block, the Commission would facilitate beneficial arrangements between the E Block and the immediately adjacent A Block licensees that would enable a package of 2 x 7 MHz for the combined A and E Blocks. In MEAs where the E Block licensee is able to successfully negotiate with the A Block licensee, the band would effectively look as follows:



<sup>73</sup> *Service Rules for Advanced Wireless Services in the 1.7 GHz and 2.1 GHz Bands*, Order on Reconsideration, WT Docket No. 05-353, FCC 05-149 at ¶ 14 (rel. Aug. 15, 2005).

Within this 2 x 7 MHz block of spectrum (the A and E Blocks combined), the first 2 x 5 MHz would be used for the 4G network that would also support public safety's broadband services, while the remaining 2 x 2 MHz would support a national 3G roaming platform for existing small and rural CMRS providers. Specifically, the 2 x 2 MHz spectrum would support a single nationwide 1.25 MHz carrier for roaming, plus appropriate guard band, using existing widely deployed CMRS technology (e.g., from the CDMA technology path). Services for rural carriers could be efficiently built by co-locating their facilities on the towers of the adjacent, 4G network.

Such a 2 x 2 MHz "sub-block" of spectrum would provide support for additional competition in the roaming market. As noted in Section I, consolidation of national carriers has dramatically reduced competition in the roaming market because the national carriers have little incentive to provide attractive roaming rates to smaller and rural CMRS providers.<sup>74</sup> Many small CMRS licensees in the PCS, AWS, and 700 MHz bands would be empowered to compete with the national incumbents in their home markets by having fair and equitable access to roaming.

Finally, by making possible a 2 x 2 MHz sub-block, the proposed band plan could also provide for a national critical infrastructure network, possibly using a nationwide CDMA-family technology (e.g., EVDO-Rev A). Within this spectrum, critical infrastructure providers would be given priority service with suitable pricing plans. This network would provide the type of advanced data capabilities being deployed today for the public safety community in the

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<sup>74</sup> See Comments of MetroPCS, ET Docket No. 07-71 at 2-6 (May 7, 2007).

National Capital Region.<sup>75</sup> These include the ability to obtain fully mobile, wide-area reliable access to an array of IP-based services such as advanced mapping and location services, which are necessary for restoring critical infrastructure after major disruptions.

**B. Public Safety Band Plan.**

At the outset and as noted in Section II, Frontline strongly agrees with the Commission that the goal of nationwide interoperability and sophisticated communications systems requires that 10 MHz of public safety spectrum (exclusive of internal guard bands) be dedicated to broadband use as part of the shared public/private network. Specifically, Frontline supports the principles articulated by the Commission in *Further Notice*; as the Commission noted, by allocating this public safety spectrum exclusively for “broadband applications consistent with a nationwide interoperability standard,” the Commission “best serve[s] [the] goal of enabling first responders to protect safety of life, health and property.”<sup>76</sup>

Nevertheless, even under an aggressive buildout schedule, the network will be up and running later in some communities than in others. Consequently, local agencies and governments working closely with the NPSL and Regional Planning Commissions in these areas may wish in the interim to build early broadband network systems that are consistent architecturally with the national interoperable network. The NPSL should approve these

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<sup>75</sup> Once again, it is important to note that only a few areas of the country are able to deploy such networks, and thus it is critical to create a nationwide broadband network.

<sup>76</sup> *Further Notice* at ¶ 253.

buildouts to ensure that the systems could be merged into the national shared network when it goes on line.<sup>77</sup>

Frontline recognizes that certain regions may wish to deploy wideband systems, and accordingly Frontline supports a rule that would allow wideband deployment, though only in the *narrowband* portion of the public safety spectrum in geographic areas where public safety's narrowband channels are not fully occupied.<sup>78</sup> Frontline also supports the Commission's proposal to consider temporary narrowband operations on the guard band between the public safety guard band and narrowband spectrum in areas affected by Canadian operations on television channels 64 and 69 *if* the Commission is able to use this approach to develop a better transition plan with the Canadian government. While this approach will effectively reduce the amount of public safety broadband spectrum by 1 MHz in those areas temporarily, Frontline recognizes the importance of maintaining such narrowband communications and believes that the temporary use of the internal guard band for such purposes provides a reasonable stopgap solution.

Frontline also agrees that users that have already deployed narrowband systems on spectrum to be reallocated to public safety broadband should be made whole. As the Commission notes, "the number of entities impacted and expected cost of reconfiguration should be relatively minor."<sup>79</sup> Frontline disagrees, however, with the *Further Notice*'s proposals that

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<sup>77</sup> If the E Block system is able to take advantage of these facilities already constructed by the Regional Planning Commission, then fair compensation should be paid to the Regional Planning Commission by the E Block licensee.

<sup>78</sup> Frontline notes that any wideband deployment in the narrowband portion is likely to be in low density areas where narrowband capacity is not needed because lower frequency systems such as VHF will probably be used.

<sup>79</sup> *Further Notice* at ¶ 264.

these “early adopters” of 700 MHz technology should be required to pay their own relocation costs. Given that the purpose of the shared, public/private network is to benefit public safety, the E Block licensee should assume the obligation to relocate these narrowband users to the narrowband spectrum at 770-776 MHz and 800-806 MHz using comparable facilities.

**C. The Commission Must Adopt Auction Rules, Including Anonymous Bidding, That Facilitate Bidding by New Entrants.**

This auction presents the Commission with the opportunity to create rules to foster competition in the marketplace and encourage new entrants to bid on the 700 MHz commercial spectrum. In addition to the importance of allowing small businesses to receive a bidding credit, discussed in Section IV *infra*, the use of anonymous bidding in the auction will increase the opportunities for new entrants to acquire spectrum and drive the wireless industry in new directions and pursue new service offerings.

The record before the Commission includes several studies evaluating the pro-competitive effects of anonymous bidding, as well as the attached paper by Drs. Skrzypacz and Wilson analyzing the problems with open bidding.<sup>80</sup> As discussed in the attached paper, open bidding raises some major concerns. First and foremost, “it gives bidders the ability to signal to each other, thus reducing auction revenues and possibly resulting in an inefficient assignment of licenses.”<sup>81</sup> Furthermore, open bidding may also “make it easier or less costly for dominant low-

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<sup>80</sup> See *Ex Parte* Letter from Media Access Project and Attached Affidavit of Dr. Gregory Rose, WT Docket No. 06-150 (Apr. 19, 2007); *Ex Parte* Letter from Media Access Project and Attached Studies by Dr. Gregory Rose: *Tacit Collusion In The AWS-1 Auction: The Signaling Problem & How Incumbents Blocked New Entrants In The AWS-1 Auction: Lessons For The Future*, WT Docket No. 06-150 (Apr. 23, 2007). See also Exhibit 1.

<sup>81</sup> Exhibit 1 at 24.

frequency incumbents to target new entrants and thereby prevent additional competition.”<sup>82</sup>

Anonymous bidding would greatly limit the ability of incumbents to engage in such practices.

As the Commission has recognized, the 700 MHz auction differs from previous auctions in that it allows for “alternatives to existing broadband networks” and reduces prior concerns about which “technologies will be deployed.”<sup>83</sup> Consequently, the advantages of open bidding which supported the Commission’s prior auction rules are not present in the 700 MHz auction. While the advantages are not present, the risks of open bidding — signaling and blocking — are very much in play. As Drs. Skrzypacz and Wilson conclude, “because of the limited upside to revelation of bidder identities and the possible harm to competition and efficient license assignment, we recommend that the Commission not reveal bidder identities during the auction.”<sup>84</sup>

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<sup>82</sup> *Id.*

<sup>83</sup> *See Further Notice* at ¶248 (“for this auction, we seek comment on whether the potential to use new 700 MHz licenses to create alternatives to existing broadband networks increases the benefits from anonymous bidding by making it harder for existing providers to identify and impede the efforts of potential new entrants to win. Does the lack of readily available technologies for use in the band, relative to existing broadband networks in other bands, reduce the potential benefit of using bidders’ identities to guess what technologies will be deployed?”).

<sup>84</sup> Exhibit 1 at 24.



**IV. CONSISTENT WITH CONGRESS’S WILL, THE COMMISSION SHOULD MAKE BIDDING CREDITS AVAILABLE TO QUALIFIED SMALL BUSINESSES IN THE E BLOCK AUCTION.**

**A. Despite an Express Congressional Mandate to Encourage Small Business Participation in the Communications Industry Via Bidding Credits, the *Further Notice* Tentatively Concluded to Withhold Them in the E Block Auction.**

The *Further Notice* gave two reasons for tentatively concluding that otherwise qualified small businesses should not be allowed bidding credits in the E Block auction. Neither is supported by law, Commission precedent, or sound public policy, and both should be rejected.

*Tentative Conclusion 1:* Small businesses should not bid on nationwide licenses because by definition they lack the capital to implement and operate them.

The *Further Notice* tentatively concluded that a small business would be inherently unable to meet the capital requirements of the E Block licensee’s obligation to construct a nationwide, open access broadband wireless network which will “have extremely high implementation costs.”<sup>85</sup> This conclusion flies squarely in the face of Congressional intent.

The Licensing Improvement Act that Congress adopted as part of the OBRA Act of 1993 required the Commission to “ensure that small businesses, rural telephone companies, and businesses owned by members of minority groups and women are given the opportunity to participate in the provision of spectrum-based services.”<sup>86</sup> Section 309(j)(3)(B) of the Act also required that, in establishing eligibility criteria and bidding methodologies, the Commission promote “economic opportunity and competition ... by avoiding excessive concentration of licenses and by disseminating licenses among a wide variety of applicants,” including small

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<sup>85</sup> See *Further Notice* ¶¶ 284–86.

<sup>86</sup> See *id.* at ¶ 284 (citing 47 U.S.C. § 309(j)(4)(D)).

businesses. The statute also required the Commission to consider “the use of bidding preferences and other procedures” to meet these objectives.<sup>87</sup>

Recent Congressional statements have emphasized the importance of Section 309(j)’s legislative aims in the specific context of the E Block auction.<sup>88</sup> The Commission should heed this Congressional call to draw diverse applicants into its spectrum auctions.

The 1993 Budget Act’s bidding credit provisions were meant to reduce barriers to entry for small businesses. Their purpose was not to confine small business bidding credits to less important services or smaller coverage areas. No reading of the statute demonstrates an objective to keep small businesses small; indeed, the statute intends that the Commission’s auction processes do just the opposite.<sup>89</sup> The tentative conclusion of the *Further Notice* would create a glass ceiling, confining small businesses to less “important” communications roles and services, and would, in this case particularly, preordain an auction result for the E Block license of more consolidation and less competition.

The *Further Notice* pointed to a single line in the 1993 House Committee Report on the 1993 Budget Act, where the Commerce Committee stated that “[t]he characteristics of some services are inherently national in scope, and are therefore ill-suited for small business.”

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<sup>87</sup> See 47 U.S.C. § 309(j)(4)(D).

<sup>88</sup> See 110th Cong., House Commerce Committee, Subcomm. on Telecommunications and the Internet, “Digital Future of the United States: Spectrum Opportunities and the Future of Wireless,” Apr. 19, 2007, Statement of Chair Rep. Ed Markey (“the law specifies that the Commission should seek to ... promot[e] economic opportunity and competition in assuring that new innovative technologies are readily accessible to the American people by avoiding excessive concentration of licenses and by disseminating licenses among a wide variety of applicants including small businesses”).

<sup>89</sup> If the Commission’s reasoning for tentatively withholding small business bidding credits in the E Block auction were taken to its logical conclusions, small businesses would be barred altogether, not simply denied credits.

On this basis, the *Further Notice* tentatively concluded that Congress did not intend Section 309(j)'s bidding credit provisions to apply to a nationwide license auction where "it was unclear whether small businesses could attract the capital necessary to implement and provide a nationwide service."<sup>90</sup> But the House Committee Report interpreted Section 309(j) as granting the Commission only the *discretion* to determine whether small businesses should be eligible for bidding credits in a particular auction. Neither statutory language in the 1993 Act nor the House Committee Report *obligates* the Commission to withhold bidding credits to otherwise qualified small businesses in all nationwide auctions.<sup>91</sup> Therefore, the Commission has the statutory responsibility to exercise that discretion reasonably. It will not have met this responsibility if it denies small business credits in this case.

The notion that a small business would be inherently unable to meet the costs of building out and operating a nationwide network is not supported by the Commission's definition of a small business, which is based not on cash reserves, assets, or construction capacity, but on the applicant's revenues.<sup>92</sup> The small business definition *presupposes* that the

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<sup>90</sup> See *Further Notice* ¶¶ 285, 286 & note 579 (citing H.R. Rep. No. 103-111, 103rd Cong., 1st Sess., at 254). If the concern is about the capability of a small business to finance the construction of the E Block/public safety network, the Commission should adopt and implement suitable financial qualification requirements to be evaluated applicant-by-applicant. It should not deny eligibility to an entire class of bidders.

<sup>91</sup> The *Further Notice*'s use of the DBS situation to justify withholding small business bidding credits in the case of the E Block is inconsistent with the Commission's finding that it is "more appropriate to define the eligibility requirements on a service-specific basis, taking into account the capital requirements of each particular service in establishing the appropriate threshold," given "the diversity of services that may be subject to competitive bidding and the varied spectrum costs and buildout requirements associated with each." *Implementation of Section 309(j) of the Communications Act—Competitive Bidding*, Second Opinion and Order, 9 FCC Rcd 7245 ¶ 145 (1994).

<sup>92</sup> See 47 C.F.R. § 12110(b) (defining a "small business" exclusively by "[t]he gross revenues for each of the previous three years" of the entity, its related affiliates, and its controlling interests).

bidding credit-eligible entity will not have substantial revenues, but will, on the strength of its business plan, “attract the capital necessary” to build and operate the communications service covered by the license. To disqualify small businesses from participating in a national auction on the very grounds that establish the eligibility for bidding credits is arbitrary and capricious.<sup>93</sup>

In addition, the circumstances surrounding the two nationwide license auctions that the *Further Notice* cited as support for withholding bidding credits here were far different from the circumstances of the E Block auction. In both of the earlier cases, the Commission relied on record evidence that there were no small businesses willing to offer the nationwide service in question. In the DBS auction the Commission declined to offer bidding credits to small businesses because “[n]o commenter[] asserted that small businesses could attract the capital necessary to provide service on all the channels available” in the relevant spectrum, and “[c]ommenters that identify themselves as a small or minority-owned business do not express an interest in obtaining all” of the available channels.<sup>94</sup> Not a single eligible small business expressed the willingness or capacity to bid on the entire spectrum block to be auctioned, and the Commission found that auctioning the undivided DBS spectrum block would better serve the public interest than to split it into pieces.

In the case of the DARS auction, the Commission pointed out that “the purpose of such provisions [the bidding credit provisions] is to attract the participation of a wide variety of small business applicants.” It then reasoned that “[i]n view of the fact that this [DARS auction]

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<sup>93</sup> If the Commission were to disallow a bidding credit to a particular winning bidder in the E Block auction on the basis of its tentative conclusion in the *Further Notice*, that winning bidder should be allowed to pay the amount of the full bid and then litigate whether it was entitled to a small business credit.

<sup>94</sup> See *Revision of Rules and Policies for the Direct Broadcast Satellite Service*, 11 FCC Rcd 9712 ¶ 216 (1995) (“*DBS Auction Rules*”).

is a closed auction with a fixed number of eligible applicants, this purpose of attracting a wide-array of applicants will not be served here.”<sup>95</sup>

The E Block auction is entirely different from the DBS and the DARS auctions. *First*, unlike the DBS auction, there is at least one potential E Block bidder (Frontline), and Frontline is confident there will be others, that will meet the Commission’s qualifications for a small business, has a bona fide basis for raising funds to compete in the auction, and is willing, able and has the capability to fulfill its obligations as the E Block licensee. *Second*, also unlike the DBS auction, the eligible small business in the E Block auction is willing to bid on the entire E block of spectrum at auction, and has not offered any proposals to segment the E Block into smaller pieces.<sup>96</sup> *Third*, unlike the DARS auction, the E Block auction is not “a closed auction with a fixed number of eligible applicants”; instead it is open to any bidder willing to take on the E Block licensee’s wholesale, open access and buildout obligations. Therefore, Section 309(j)’s purpose of “attract[ing] a wide variety of small business applicants” would be served by making credits available for eligible E Block bidders who qualify under the Commission’s rules as small businesses.

*Tentative Conclusion 2: “Wholesaling” by a small business would automatically make it ineligible for a bidding credit.*

The *Further Notice*’s second tentative conclusion was that providing a bidding credit to an otherwise qualified E Block bidder would run afoul of the “impermissible material

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<sup>95</sup> *Establishment of Rules and Policies for the Digital Audio Radio Satellite Service in the 2310-2360 MHz Frequency Band*, 12 FCC Rcd. 5754 ¶ 175 (1997).

<sup>96</sup> *Compare DBS Auction Rules* ¶ 216 (“Commenters that identify themselves as a small or minority-owned business do not express an interest in obtaining all the channels available ... Instead, they argue for their interest in providing service with no more than half of the channels available at an orbital location. No commenters assert that small businesses could attract the capital necessary to provide service on all the channels available.”).

relationships” rule. The rule, in the words of the *Further Notice*, would “plainly preclude any licensee that is required to operate only as a wholesale provider,” such as the E Block licensee, “from receiving DE benefits.”<sup>97</sup> In turn, the Designated Entity (DE) rules provide that an otherwise eligible small business cannot receive a bidding credit if it has impermissible material relationships, which are defined as “arrangements with one or more entities for the lease or resale (including under a wholesale agreement) of, on a cumulative basis, more than 50 percent of the spectrum capacity of any one of the applicant’s or licensee’s licenses.”<sup>98</sup>

The purpose of this rule is to deter “arrangements” which “impede a DE’s ability to become a facilities-based provider, as intended by Congress.”<sup>99</sup> However, the E Block licensee will be, by any definition, a “facilities-based provider.” It will be required, by its license terms, to build the towers, radios and routers to provide a broadband, open access, wholesale network that will best serve the public interest.

The Commission adopted the “lease or resale” prohibition to prevent a big business from providing cash to an eligible DE, who wins a license via a bidding credit and then purchases (or leases) the raw spectrum from the DE, thereby sharing with the DE the benefit of the bidding credit which equals the incremental amount of money it would have had to pay to the Treasury had it bid under its own name. The term “wholesale” was added so that the bar on

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<sup>97</sup> See *Further Notice* ¶¶ 287–88.

<sup>98</sup> 47 C.F.R. § 1.2110(b)(3)(iv)(A) (cited at *Further Notice* ¶ 287).

<sup>99</sup> *Implementation of the Commercial Spectrum Enhancement Act and Modernization of the Commission’s Competitive Bidding Rules and Procedures*, Second Report and Order and Second NPRM, 21 FCC Rcd 4753 ¶ 23 (2006) (“*Material Relationships Order*”). The rule also sought to “effectively prevent entities ineligible from designated entity benefits from circumventing the intent of the rules by obtaining those benefits indirectly, through their investments in qualified businesses.” *Id.* at ¶ 8. Frontline, of course, is not fronting for businesses that otherwise would not qualify for a small business bidding credit.

reselling raw spectrum could not be circumvented by wholesale arrangements that served the same function as resale arrangements.<sup>100</sup>

That is not the case here. In the first place, the rule speaks of reselling “spectrum.” In contrast, the E Block licensee will be required to spend \$15-20 billion to construct the required network and the E Block licensee simply will be selling capacity on its fully funded network in the same manner as Level 3 sells capacity on its network. It will not be reselling raw spectrum. In the second place, the E Block licensee will not be reselling or wholesaling the network capacity primarily to one entity, let alone to an entity for which it is fronting. The E Block’s wholesale, open-access requirements, described in Section I above, assure that no one entity will be able to purchase as much as 25% of the E Block licensee’s capacity. As a consequence there is no risk that the E Block would be, at the time of the auction or in the future, a sham DE created to allow a big business to escape paying the full value of its license into the Treasury.

Nor should the E Block auction be held ineligible for small business participation on the ground that Congress intended that “every recipient of our DE benefits is an entity that uses its licenses to directly provide services for the benefit of the public.”<sup>101</sup> The E Block licensee *will* directly provide network services “for the benefit of the public,” even though those services will be provided to retailers, who will then offer an array of beneficial services to consumers. The quoted language does not say that the services must be provided “to the public.”

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<sup>100</sup> The network services that the E Block licensee will provide to public safety, to critical infrastructure providers and to participants in the open auction that it will conduct (see Section I.C.3. above) will often be retail services.

<sup>101</sup> *Further Notice* ¶ 288 (citing *Material Relationships Order* ¶ 15).

It requires only that the services be “for the benefit of the public,” and a lower price and a path to innovation certainly will benefit the public.

It is true that the proposed open access, wholesale rules mean that more than 50% of the E Block network’s service capacity will be sold to retailers, but that is because the Commission will have found that that requirement advances the public interest. The purpose of the proposed wholesaling requirement is to make opportunities available to new entrants. It would be arbitrary and capricious to rely on a requirement established to *promote* small business entry into the communications field as the reason for *barring* small business bidding credits in the E Block auction.

As Frontline has shown earlier, the optimal use of the E Block spectrum is to support an open access, wholesale network. If the Commission is convinced that this is so, it should adopt service rules that implement this conclusion. With such service rules in place, then any bidder must offer service at wholesale. This would not then be a rational grounds on which to disqualify a firm from DE status. But in a version of *Catch-22*, the *Further Notice* reasons that any small business bidder for spectrum allocated for wholesale use will be disqualified because the spectrum is to be used for wholesale purposes.

The Commission is authorized to shape its bidding credit rules, service by service.<sup>102</sup> The obvious way for the Commission to harmonize the goal of encouraging new small-business entrants into spectrum-based industries and the goal of using the E Block to provide wholesale services is to interpret its bidding credit rules, and the reference to wholesale services in particular, as not applying to the E Block auction.

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<sup>102</sup> See *Implementation of Section 309(j) of the Communications Act—Competitive Bidding*, Second Opinion and Order, 9 FCC Rcd 7245 ¶ 145 (1994).



**B. Small Business Bidding Credits Are Particularly Appropriate For the E Block Auction.**

The *Further Notice* failed to consider the various powerful reasons for granting bidding credits to small businesses in the E Block auction that meet all of the qualifications established by the Commission to determine eligibility.

First, grant of a bidding credit in so capital intensive an enterprise as the E Block license is essential if new entrants are to participate in the wholesale, open access broadband service that should be the objective of the E Block auction. The fact that the bidding and construction costs for the E Block spectrum will be high – but well within the financial capability of entrenched incumbents – means that new entrants must raise substantial funds from investors who, recognizing the large financial advantages of the incumbents, will be reluctant to participate without the benefit of small business bidding credits. Without them, small businesses, with no revenue or cash on hand, will be simply unable to attract the funds necessary to compete with incumbents who, in the case of Verizon, have \$24 billion in interest-free cash reserves with which to bid. Bidding credits are also necessary for new entrants to counter the “blocking premium,” described in Section I.A.1, that entrenched incumbents will be willing to pay in order to keep out new competitors.

Second, uniquely in this auction, it is necessary that new entrants participate for the benefit of both new entrant retailers and public safety. The highest and best use of the E Block spectrum is for an open-access, wholesale network that will break the bottleneck on new services, new devices and new competition that the existing, highly concentrated wireless industry cannot and will not support. Because incumbents have incentives to maintain the bottleneck, as well as to raise wholesale prices above a competitive level, only a new startup can offer a competitive alternative. Moreover, public safety should not have to partner with the

largest wireless incumbents who have tended to deny its need for additional spectrum and who would provide service to public safety only as part of a strategy to block new competition.

*Third*, public policy, as determined by Congress, calls for the Commission affirmatively to promote new entrants in spectrum-based industries, especially where the consolidation of those industries stands in the way of small businesses' access to the market. Commission studies have reported that DE-eligible entities have historically faced "unique and significant" barriers to entry in the wireless license market, from discrimination in lending and access to capital to an inability to lobby the Commission or Congress for needed regulatory or legislative changes.<sup>103</sup> Small businesses' under-representation in the auctioned license services is equally stark. For example, in the AWS auction, in spectrum value terms, the licenses won by DEs at auction represented just \$551 million of almost \$14 billion worth of spectrum – for a share of only four percent. Given this disparity, the Commission should exercise its discretion in favor of creating more opportunities for eligible small businesses, not fewer.

In short, the reasons for exempting the E Block auction from the usual small business bidding credit entitlement do not stand up to scrutiny and are suspect legally, while the reasons for applying the normal bidding credit policies to the E Block auction are especially compelling.

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For the reasons set forth in these comments, the Commission should adopt the above recommendations for optimizing use of the E Block spectrum.

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<sup>103</sup> See "Whose Spectrum Is It Anyway?: Market Entry Barriers, Discrimination and Changes in Broadcast and Wireless Licensing, 1950 to Present," Prepared for FCC Office of General Counsel by Ivy Planning Group LLC (Dec. 2000), *available at* [www.fcc.gov/opportunity/meb\\_study](http://www.fcc.gov/opportunity/meb_study).

Respectfully submitted,

/s/ Jonathan D. Blake

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May 23, 2007

# **EXHIBIT 1**

# **The Design of the 700 MHz Spectrum Auction: An Opportunity to Promote Competition and Public Safety**

Andrzej Skrzypacz and Robert Wilson<sup>1</sup>

23 May 2007

## **1 Summary**

We comment on the service and auction rules discussed in the Report and Order and Further Notice of Proposed Rule Making, FCC 07-72, 27 April 2007. We recommend that the FCC designate one license for a wholesale operation that provides open access nationwide on nondiscriminatory terms. This is necessary to enable entry of new businesses offering wireless services in retail markets. It also enables local operators to offer roaming at competitive prices. The new license accords with the Commission's policy to encourage competition, and recognizes the benefits to consumers from low prices and expanded services.

Strengthening competition is especially important now after recent mergers that consolidated the wireless industry into at least two dominant firms with wide coverage and vertically integrated networks; moreover, the major firms' leverage is magnified by their dominant positions in the markets for wireline telephony and broadband. These developments circumvent the Commission's longstanding efforts to sustain competitive pressures in the market for wireless services.

Certain restrictions on this new nationwide license may be necessary to ensure that it is used as the FCC intends. We intend to comment separately on what restrictions might be appropriate at a later time.

We endorse the proposal that the licensee should develop its network in cooperation with public safety agencies for which the FCC has reserved adjacent spectrum, allowing however that these agencies can opt out.

We suggest that the auction rules enforce anonymous bidding, and allow bids for a designated set of packages of regional licenses and multiple bands. Because the current largest two holders of low-frequency spectrum have strong incentives to thwart entry of new retailers, we recommend that the FCC provide bidding credits for small businesses and other designated entities.

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<sup>1</sup> This paper was funded by Frontline Wireless, LLC. Curriculum vitas are attached as Exhibit A.

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## 2 Introduction

The auction of 700 MHz spectrum is a critical event for the future of wireless services in America. This low-frequency spectrum is scarce and allows much better propagation than the less scarce higher-frequency spectrum. It enables better coverage at lower cost, especially outside metropolitan areas. These superior physical properties translate into economic considerations—this spectrum will play a crucial role in shaping the industry and its products and prices for decades to come. The spectrum is particularly important for the prospect of new entrants in the market for wireless broadband services. FCC decisions regarding the service rules and the auction design will be as important as the decisions before the auction of the PCS spectrum in 1994, which unleashed a wave of increased competition that benefited consumers.

In this paper we discuss the proposals for service rules and auction design for which the FCC sought comments in the Report and Order and Further Notice of Proposed Rule Making, FCC 07-72, 27 April 2007 (hereafter “the Notice”). The Commission calls these the “Frontline proposals,” but in this economic report we address the generic features of these proposals.<sup>2</sup> The main ingredients of the proposals are an *open-access network integrated with public safety*. We focus on three issues related to the proposals: auction of a license for the “E Block” that requires (1) open access on nondiscriminatory terms; (2) wholesale operation of that spectrum by the licensee; and (3) development of the public safety network. We also briefly discuss other issues related to the auction rules: anonymous bidding, package bidding, and bidding credits.

Since the removal of the spectrum caps in 2003 the commercial mobile radio industry in the United States has steadily consolidated. Currently, two firms account for 53% of all industry revenue, and four firms account for 90%. According to the Department of Justice’s common measure of market concentration, the wireless market is highly concentrated. Moreover, the two largest firms offer the broadest coverage for wireless, which allows them to charge wireless prices much higher than small firms. Verizon and AT&T have the great advantage of owning spectrum derived from the original cellular grants in the late 70s and early 80s, which like the 700 MHz spectrum, came from UHF channels. The long wavelengths, relative to PCS or AWS spectrum, lead to unique coverage advantages. Additionally, the two leading firms each have even greater shares in their home wireline markets, and are in a unique position to offer a triple-play of wireless service, broadband (DSL or fiber), and wireline phone. As they build out their fiber optic facilities they will offer a quadruple play that also includes video programming.

Coverage, or easy roaming, is an important feature of wireless service. In order to couple coverage/roaming with local service, any firm that wants to compete effectively with Verizon and AT&T either must build a nationwide network or acquire at wholesale the use of such a network. But this auction is the only major auction of low-frequency spectrum suitable for constructing coverage networks at low cost. AT&T and Verizon therefore have substantial incentives to acquire the 700 MHz spectrum, even if they have little intention to build on it for years to come, since winning the spectrum would deny this competitive advantage to rivals. These firms also have an incentive not to offer roaming service at competitive wholesale rates.

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<sup>2</sup> Although the Notice refers to several aspects of the issues we address as “Frontline proposals,” our view is that the main ingredients could have been proposed by any party before the Commission, and it is immaterial that they were initially proposed by the firm that funded the preparation of this economic report. Specifically, the primary features in the public interest are designation of a spectrum band reserved for a wholesale-only business providing open access on nondiscriminatory terms, and design and operation conducted in cooperation with public safety agencies.

Denying roaming or charging high prices for roaming exploits Verizon and AT&T's competitive advantage, raising retail prices at the expense of consumers and efficiency.

Action now by the Commission can break the current spectrum gridlock and begin a new phase of rapid innovation in the wireless industry. The essential ingredient is an open-access infrastructure that sustains market conditions favorable to new entry and intensified competition.

Several recent developments significantly affect our analysis of the wireless industry and the potential impact of the 700 MHz auction.

First, consumers now expect their wireless providers to offer services on a nationwide basis, even if most of their usage is in their local areas. Access to nationwide coverage is hence crucial for operators or potential new operators serving local markets.

Second, as we stated above, in recent years the industry consolidated, leaving only four nationwide vertically-integrated service providers and only niche local players. The wave of mergers largely reversed the results of Commission policies that introduced additional competitors into the market. Moreover, the pace of consolidation is increasing as the two largest providers, Verizon and AT&T, add customers at a much faster rate than the others.<sup>3</sup> Together, Verizon and AT&T account for two-thirds of industry net additions. These are nationwide averages, and evidence suggests that on the regional level the concentration is more severe—one or two firms may dominate in many geographical markets. Moreover, Verizon and AT&T also have the advantage of offering bundled products, in the form of the so-called triple play, where each is allied with its wireline progenitor.

Third, the roaming proceedings remain in impasse, with both sides offering good arguments: the incumbents argue that a vertically integrated business is more efficient and that obligatory roaming would make that business model difficult to sustain, and potential competitors ask for obligatory roaming to allow them to offer nationwide coverage at fair prices without threats of holdup.

Fourth, in addition to out-of-market roaming coverage, in-market network coverage and reliability (a byproduct of coverage) has become a major factor—perhaps *the* major factor—in customer buying decisions. Customer surveys routinely indicate in-market coverage to be a major reason for switching carriers. Verizon and AT&T routinely advertise “It’s the Network” and “Fewest dropped calls,” respectively. As mentioned above, these carriers are adding customers at the fastest rate, faster than competitors Sprint and T-Mobile, who tend to advertise price, value, and network features. Verizon and AT&T also have seen their customer churn rates drop.<sup>4</sup> The carriers who lead the market on network coverage are the holders of the original low-frequency cellular licenses.

Fifth, as a result of customers’ demand for nationwide services, and the proprietary character of the existing networks, the two nationwide dominant low-frequency wireless providers offer preferential pricing for calls “on the network” or “in network.” Such pricing generates network effects and attracts customers to the small number of providers with large networks. As a result, consolidation and increasing concentration could accelerate in the future. In network industries with large fixed costs—such as the transmission segment of wireless communications—it is difficult to sustain large numbers of firms, since these tend to be natural oligopolies. Maintaining

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<sup>3</sup> See Merrill Lynch, “US Wireless Matrix,” 4th Quarter 2006. Table 6 (pg. 14).

<sup>4</sup> See Merrill Lynch, “US Wireless Matrix,” 4th Quarter 2006. pg. 31.

competition in wireless transmission is especially difficult because the limited amount of usable radio spectrum imposes additional physical barriers to entry.

The Commission faces the difficult task of auctioning scarce spectrum in a way that promotes social welfare. This task is best served by providing an infrastructure that promotes competition and allows innovative technologies to develop. In order to assure that any firm, especially a small firm, is able to effectively compete with Verizon and AT&T, the firm must have access to nationwide coverage at competitive rates. We discuss here one sensible approach: the FCC demarcates some of the 700 MHz spectrum for a licensee that will commit to selling at wholesale to all buyers and not primarily the top-two firms. In particular, we make the following observations:

First, it is possible to establish a license that obligates the winning licensee to operate a wholesale network that supports multiple retail competitors. Such a network would enable existing firms and new entrants—including Mobile Virtual Network Operators (MVNOs)—to compete among themselves, and importantly, also with the retail operations of the vertically-integrated incumbents. This opportunity exists because consumers buy wireless service that is a bundle of two components: wholesale access to a nationwide connectivity service and the provision of retail services to particular consumers. For example, a cell phone first provides access to a network and then enables a voice conversation under terms specified by some calling plan purchased at retail by the cell phone owner. Large investments and high operating costs are required only to establish the network connectivity part of the bundle, while the retail service component has much lower fixed and variable costs and can be implemented with many different marketing strategies and calling plans. Although physical limits on spectrum availability and high capital costs limit the number of providers providing transmission access, a wholesale network can support many retail competitors. The current industry structure—a few proprietary networks—prevents such a favorable outcome by perpetuating the control of the available spectrum most suited for that purpose by the top two low frequency wireless providers, AT&T and Verizon.

Second, given the concentrated market structure, the participants in the auction for new spectrum have different economic incentives depending on whether they are new entrants or existing incumbents. An entrant that wins a license wants to operate so as to maximize the value of the license. In contrast, an incumbent bidding for a new license takes into account that new licensees can attract customers from its existing business and thereby jeopardize its profits and diminish the scarcity rents from its current licenses. As a result an incumbent is not neutral about how the spectrum is allocated and used, even if it does not win a new license itself. This is a major difference from auctions where all players start on equal footing. We argue in this report that the dominant low-frequency incumbents' incentives to protect current profits are large, and could undermine the efficiency of the auction outcome. In particular, this distortion leads incumbents to value the new licenses more than the true economic value to society and thus is likely to lead to a misallocation of the scarce spectrum.

Owing to these two observations, we recommend the following solution:

- Require that at least one licensee, the E Block, must provide open access on nondiscriminatory terms. The winner of this license should be primarily or entirely a wholesale operator (hereafter, “wholesale-only”) offering nationwide access and transparent pricing to third-party retail service providers. This provides a level playing field for retail service competition in the wireless market.



This solution enables the FCC to eliminate the bottleneck on access to wide-area networks. It avoids *de facto* endorsement of vertical integration as the only viable business model, and reasserts the Commission's expressed intent to promote competition in the market for wireless services. Establishing the E Block license assures that for at least one segment of the spectrum there is a wholesale market for nationwide network connectivity unbundled from retail services. It establishes the infrastructure needed to promote a more competitive market. Even though necessarily there will be few operators of networks, there can be unhindered entry into retail services.

We do not recommend mandating open access on the whole spectrum, only on the E Block. This recommendation leaves ample spectrum for integrated business models that may turn out to be more efficient for some applications than the open-access model.

The ultimate beneficiaries of new business plans will be retail consumers. Intensified competition lowers prices and strengthens incentives for innovation. Instead of possibly zero new entrants—if the Commission declines to prevent dominant low-frequency incumbents from foreclosing entry—or one new entrant, nondiscriminatory open access to the E Block's wholesale network enables many entrants to compete for retail customers with a variety of business plans and an array of services. Increased competition will benefit customers by reducing prices, increasing coverage, and encouraging a wider array of service offerings of higher quality.

We also address the public safety component of the proposal. In its design of the 700 MHz service rules and auction rules, the FCC has an historic chance to ensure high quality, nationwide, interoperable, low-cost service for public safety uses. The proposal circumvents the roadblocks that could delay or eliminate the possibility of a top-quality public safety network. It ensures that public safety organizations have an option to contract for a private-public partnership that will build an efficient system compatible with their requirements. The plan has the potential to produce a high-quality, interoperable, open-access network with substantial cost savings due to economies of scope.

Finally, we discuss the bidding rules and recommend the following ingredients:

- Structure the spectrum blocks and auction rules to promote efficient geographical coverage. Due to spatial economies in construction and wholesaling, and the advantages of a reliable nationwide interoperable public safety system, we recommend that the E Block be a single nationwide license.
- For the remaining blocks, we recommend smaller service areas, especially because availability of access to the nationwide open-access E Block enables a business model based on a local license to be complemented by nationwide roaming on the E Block. We also recommend simple package bidding that allows bidders to aggregate licenses over geographical areas without exposure risks—i.e. risks amplified by competitors' strategic bidding.
- Use anonymous bidding to prevent bidding strategies aimed at reducing competition.
- Provide bidding credits for new entrants to counterbalance the low-frequency nationwide incumbents' incentives to deter new entrants, and to recognize the benefits for consumers from renewed competition due to new entry.

In this report we first provide background on the state of the industry and then discuss details of the proposed solutions and the economic rationales behind them, as well as the economic tradeoffs.

### 3 The wireless industry is vulnerable to inadequate competition

In this section, we outline the current market structure of the wireless industry and explain why, absent Commission action, continuation of that structure will inhibit the development of new products and services and cause consumers to pay higher prices.

#### 3.1 The market for wireless services is highly concentrated

Beginning in 1995, consumers enjoyed the remarkable benefits of competition in the wireless services market. Consumers benefited from both lower prices and improved services as a result of new entry into the wireless market. The new entry was a direct response to Commission policies that made spectrum available to entities other than the low-frequency incumbent providers. Demand expanded in terms of both subscribers and minutes to the point that now wireless communication rivals wireline in terms of minutes of use.

However, some of those same changes produced market conditions that led to the demise of regional operators. Customers have expressed strong preferences for nationwide service, absent exorbitant roaming charges. As a result, even large and formerly strong regional carriers such as US West and Bell South were forced into mergers that resulted in six nationwide carriers. Aside from some niche operators, nationwide service now appears to be an essential service in mobile telephony. In 2006, vertically-integrated, nationwide operators provided 90% of the retail wireless market, as shown in Table 1.

**Table 1. Wireless market share by year**

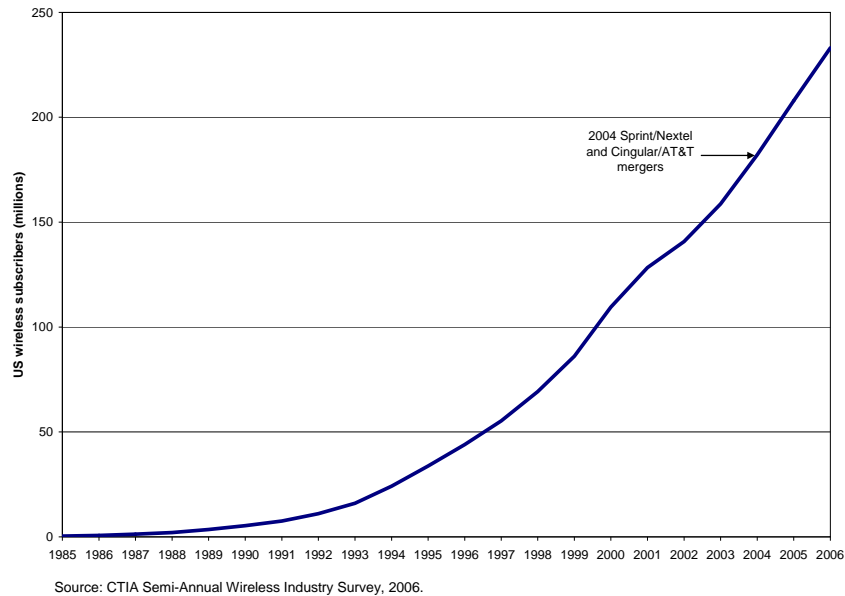
Carrier	Market share by year (%)				
	2002	2003	2004	2005	2006
Verizon	23	23	28	25	26
Cingular	18	16	29	27	27
AT&T	19	18			
Sprint	14	13	13	25	25
Nextel	11	11	7		
T-Mobile	6	8	10	12	12
Others	8	10	15	11	10
Total	100	100	100	100	100

Note: Totals do not sum due to rounding.

Source: Merrill Lynch "Global Wireless Matrix 4Q06," pg. 178.

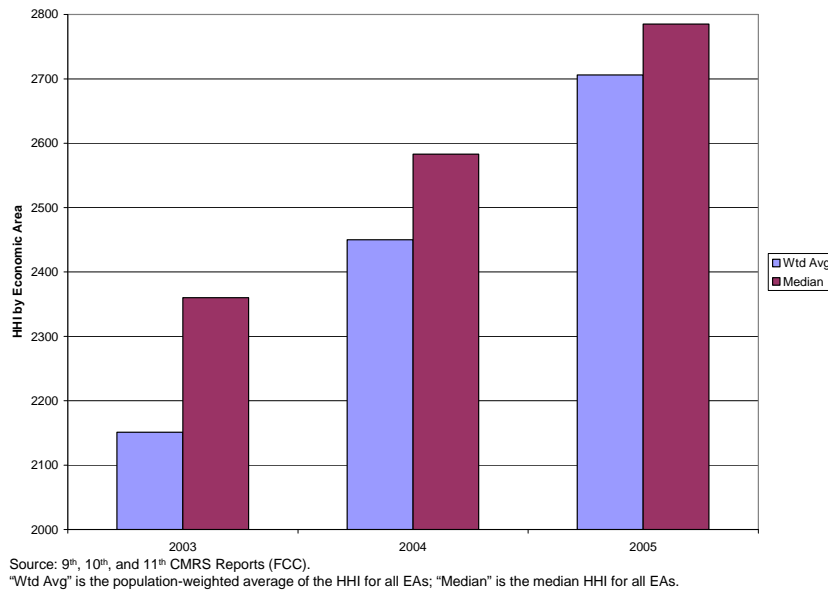
The initial consolidation of local and regional licensees into nationwide providers was followed by a second wave of mergers among the larger providers. First, Cingular merged with AT&T Wireless in October 2004, and then Nextel merged with Sprint in December 2004. The industry now has only four nationwide operators: AT&T, Verizon, Sprint, and T-Mobile. Consolidation often occurs in industries, but typically in *declining* industries where there are not enough customers for existing firms to maintain efficient scale. Shakeouts also do occur in new industries in which demand is growing. Nonetheless, we are concerned that this consolidation occurred at a time of tremendous growth, as shown in Figure 1.

**Figure 1. Consolidation at a time of rapid growth**



The most widely used measure of market concentration is the Herfindahl-Hirschman Index, HHI.<sup>5</sup> HHI in the wireless services industry at the end of 2005 was over 2,700.<sup>6</sup> By this measure, the wireless services market is highly concentrated. Figure 2 shows how market concentration has increased steadily in the last three years.

**Figure 2. The wireless market has become more concentrated**



<sup>5</sup> The U.S. Department of Justice, for example, uses the HHI for evaluating mergers. A market with an HHI less than 1,000 is considered to be competitive, one with an HHI between 1,000 and 1,800 is considered to be moderately concentrated, and one with an HHI of 1,800 or greater is considered to be highly concentrated. To compute the HHI, one sums the squares of the sellers' market shares. The HHI can range from a minimum of close to 0 to a maximum of 10,000. An HHI approaching zero would indicate near-perfect competition, with many thousands of sellers with negligible market shares. An HHI of 10,000 indicates the existence of a single firm with 100% market share.

<sup>6</sup> HHI is from the FCC's 11th CMRS Report, September 2006.

Together, Verizon and AT&T have:<sup>7</sup>

- 52% of the subscribers and 53% of the revenues as of December 2006,
- two-thirds of the net subscriber additions in the fourth-quarter of 2006, and
- a unique ability to directly offer a “quad-play” bundle (wireline, wireless, TV, and broadband).

An important element of their dominance is the competitive advantage derived from being the only nationwide carriers whose primary networks use low-frequency spectrum. We expect Verizon and AT&T to compete vigorously in the auction for at least part of the 700 MHz spectrum in order to preserve and strengthen this competitive advantage, even if consumers would benefit much more from the entry of a non-vertically-integrated competitor.

The four nationwide operators all provide similar vertically integrated wireless services, combining both wholesale and retail. AT&T and T-Mobile use the GSM standard; Verizon and Sprint use the CDMA standard. Often there are only two providers in a given area that are true head-to-head competitors for services such as roaming, and in some areas roaming is available only from a single party. Our fear, which is grounded in both economic theory and empirical analysis, is that this pattern of consolidation will lead to higher prices, poorer service, and reduced innovation.<sup>8</sup>

Our apprehension is well-founded. Dominant operators, such as Verizon, have taken actions such as disabling valuable phone features on their phones. For example, on 14 May 2007, a Google search of “Verizon Wireless disable features” finds over one million hits, many of which are consumers complaining and even suing Verizon for disabling features on phones. Such behavior is a common problem in monopolistic or oligopolistic markets, but can be driven out by competition. Other carriers have also disabled phone features that consumers value. The motive is to sell “value added” services to the consumers who are less price-sensitive. If they were not disabled, these features could enable customers to avoid paying extra for certain “value added services.” For example, a customer could directly download songs to her phone over Bluetooth, rather than downloading it over the Verizon network. Verizon apparently finds it profitable to engage in such practices despite the fact that disabling features annoys some customers and outrages others.

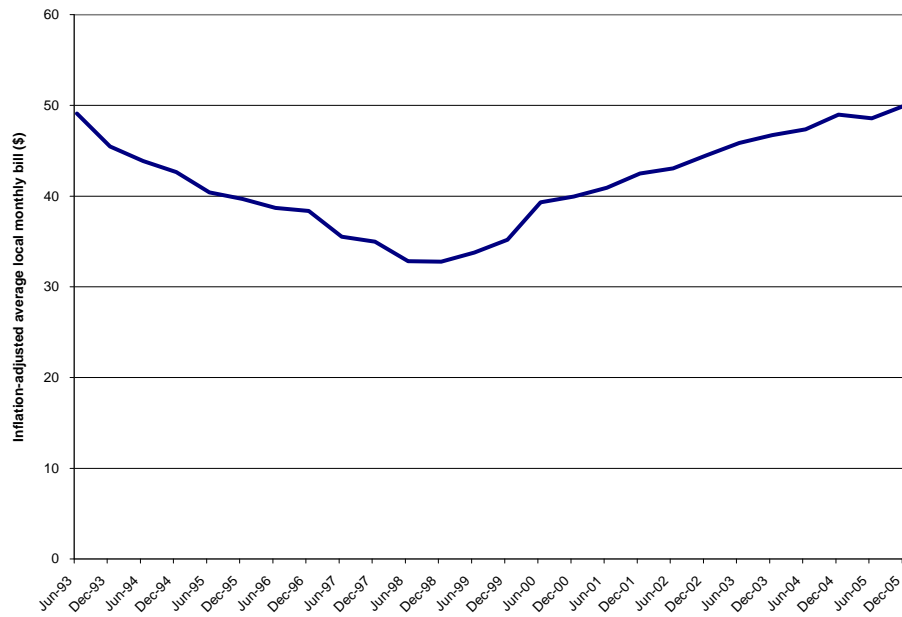
Consumer monthly bills for wireless services also suggest weak competition. As shown in Figure 3, the inflation-adjusted monthly bill initially fell, but since 1999, consumers’ monthly bills have been increasing.

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<sup>7</sup> Data from Merrill Lynch, “Global Wireless Matrix 4Q06,” 28 March 2007 at 177-178.

<sup>8</sup> See for example, William J. Baumol, *The Free-Market Innovation Machine: Analyzing the Growth Miracle of Capitalism*, Princeton University Press, 2002.

**Figure 3. Wireless monthly bills initially fell but now are rising**

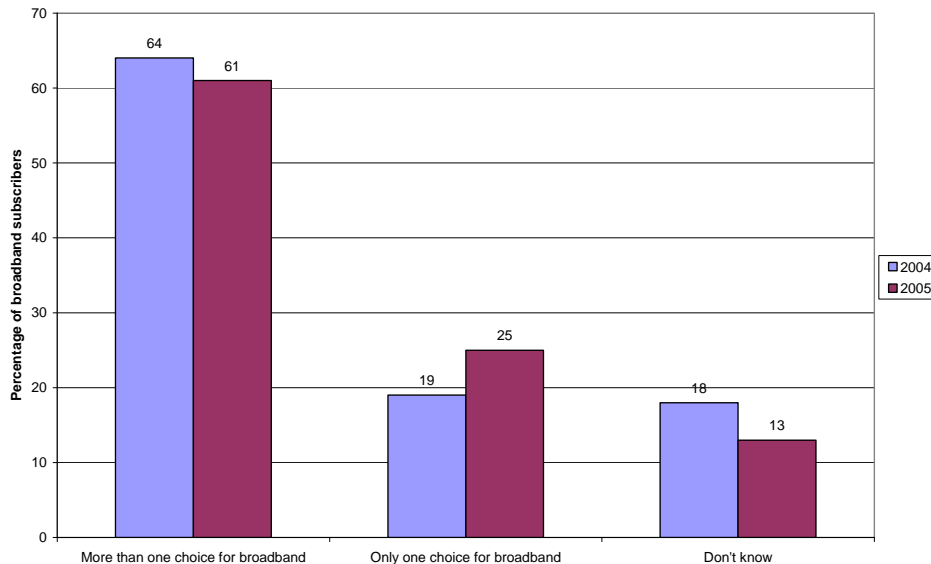


Source: CTIA report, pg 200 (table 105). CPI data from BLS, Dec 2005 dollars.

### 3.2 The market for broadband is highly concentrated

The broadband market is even more highly concentrated than the market for wireless services. Most customers have only two choices for residential broadband access: the phone company or the cable company. In 2005, one quarter had only a single choice, as shown in Figure 4. And some have no choice at all—broadband is simply not available.

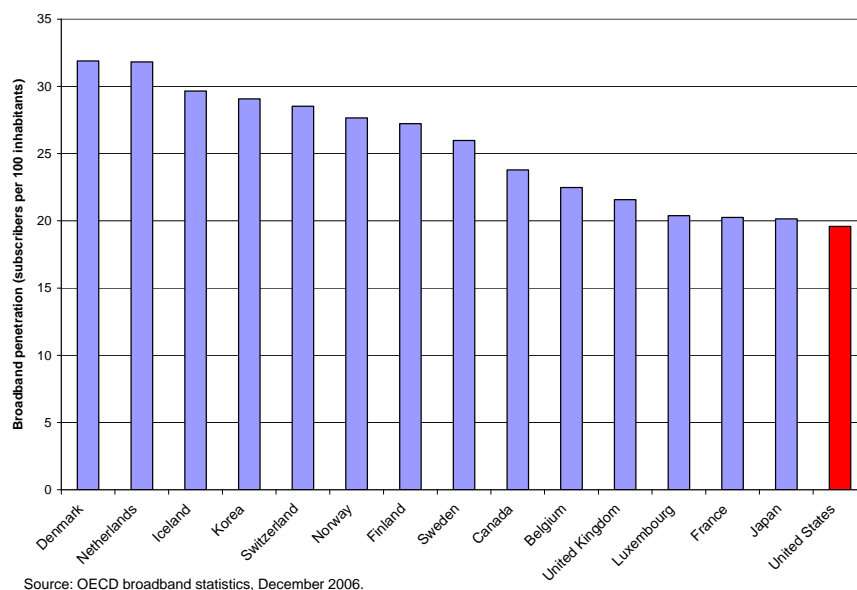
**Figure 4. One quarter of broadband subscribers have only one choice**



Source: "Home Broadband Adoption 2006," Pew Internet and the American Life Project, pgs. 7-8.

Like wireless service, broadband service has experienced rapid growth that is sure to continue. Despite the growth, broadband penetration in the U.S. lags behind many other countries as shown in Figure 5. Some of the wireless carriers have responded to this growth with broadband wireless services. However, the coverage is often quite limited, especially for true broadband speeds.

**Figure 5. Many countries have greater broadband penetration than the U.S.**



The FCC recognizes the importance of having a *third pipe for broadband*. For example, Chairman Kevin J. Martin states:

“In much of the country, however, consumers have a choice of only two broadband services: cable or DSL. And in some parts of the country, consumers don’t even have that choice. The most important step we can take to provide affordable broadband to all Americans is to facilitate the deployment of a third ‘pipe’ into the home. We need a real third broadband competitor. And we need a technology that is cost-effective to deploy not just in the big cities, but in the rural areas, as well. All Americans should enjoy the benefits of broadband competition—availability, high speeds, and low prices.”<sup>9</sup>

Because the two largest vertically-integrated wireless providers (AT&T and Verizon) are also wireline telephone companies that have made huge investments in DSL service, the current industry structure is not conducive to wireless becoming a third, independent competitive option for broadband access. The E Block proposal would, by creating an additional nationwide wireless network, offer a greater opportunity for retail providers of broadband services (through their own local networks combined with the open-access network) to develop and compete with existing broadband offerings.

<sup>9</sup> Statement of Chairman Kevin Martin, Report and Order and Further Notice of Proposed Rule Making, FCC 07-72, 27 April 2007.

Thus, we believe that the Commission is correct in emphasizing the importance of a third mode of access to broadband, and the opportunity that the 700 MHz spectrum offers to facilitate the introduction of a wireless alternative.<sup>10</sup>

### ***3.3 Barriers to entry mean the existing concentration levels (and the attendant lack of competition) are unlikely to decrease absent structural changes***

The barriers to entry are severe for both wireless and broadband services. For wireless service, a spectrum license is one important barrier. One cannot provide any service without a license, and one cannot provide nationwide service without either a nationwide license or agreements with parties that do have nationwide service. With respect to broadband, the two current physical networks most commonly used for broadband service are proprietary networks. Although wireless networks offer a third method of providing broadband service, including through non facilities-based operators (MVNOs), the existing wireline providers also own the economically feasible low-frequency spectrum needed for high quality wireless service. Thus they have drastically reduced incentives to develop wireless broadband. The second barrier to entry, for both wireless and broadband, is substantial capital investment in network infrastructure. The cost for a nationwide network is tens of billions of dollars.

As we describe later, incumbents can foreclose entry by outbidding new entrants in spectrum auctions. The low-frequency wireless incumbents have an especially strong interest in preventing a new nationwide competitor. This is an important issue that the FCC should address.

### ***3.4 Additional retail competition is needed and would provide a check on oligopolistic behavior by Verizon and AT&T***

In the presence of extremely large infrastructure costs and a limited amount of usable spectrum, there is not room for many nationwide operators of overlapping physical networks. The physical limitation on the viable number of wireless networks does not, however, necessarily limit the number of retail businesses that could provide service using network capacity acquired on a wholesale basis. There is room for more than one business model in the wireless industry, and introducing a new business model will enhance competition. The vertically-integrated proprietary networks adopted by the four nationwide providers may be particularly suited for some applications or for a certain percentage of the market as a whole. But if that business model is used exclusively, then competitive pressures could be diminished. The lack of feasibility for alternative business models prevents or reduces competition at the margin, namely competition from small companies that would readily pay competitive wholesale rates for nationwide access. These companies bring innovative ideas and technologies, but the nationwide operators have no incentive to offer a competitive wholesale service.

One expects that after there are enough companies competing for final consumers, competition among them will lead the vertically integrated firms to open their networks to third-party retail operators as a source of additional revenue. Once the competition for the final consumer is strong, the incumbents may compete for third-party providers that offer customers

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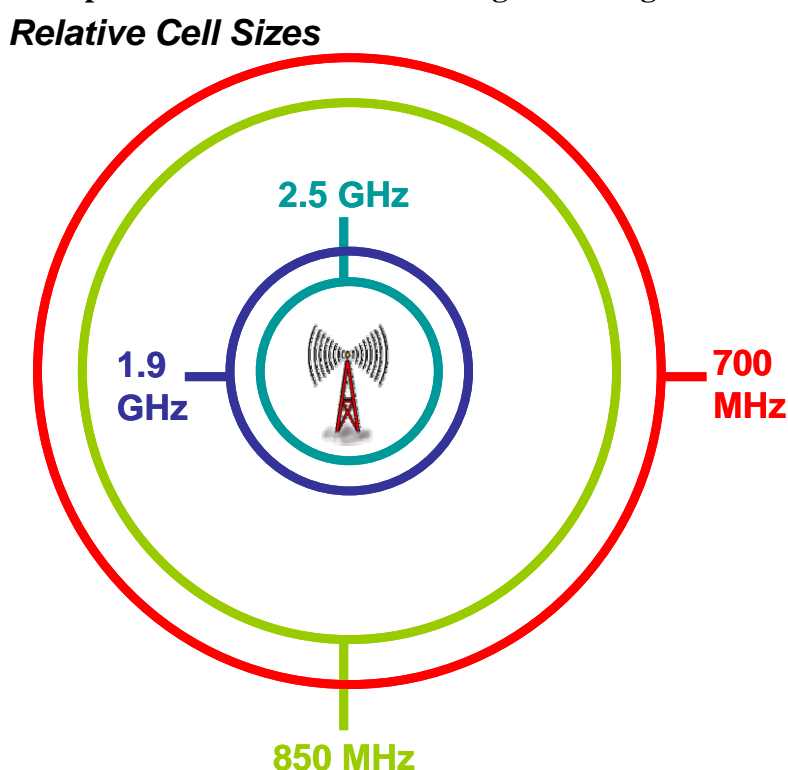
<sup>10</sup> As discussed more below, one possible use for the open-access spectrum would be as a complement to other facilities-based networks that would be able to deliver higher speed fixed access and combine with the E Block spectrum to provide ubiquitous coverage. In this way, the E Block would not necessarily be the third “pipe” but would enable a provider of broadband services to compete effectively as a third pipe against the existing dominant providers, especially for “cord cutting” customers who value mobility.

additional value. However, it is not clear how many firms are needed—that is an empirical question. As the current state of the industry demonstrates, the current structure *does not* encourage Verizon and AT&T to compete for wholesale business. Such limitation of output is a hallmark of anticompetitive behavior. For this reason, we believe that FCC action is necessary.

#### 4 The 700 MHz auction provides the best opportunity to promote additional competition

The 700 MHz auction is the last big auction on the horizon and is the only auction ever of large blocks of prized low-frequency spectrum. This spectrum has propagation characteristics that would enable new entrants to compete in network coverage and quality with the cellular incumbents. Figure 6 shows the relative cell sizes of the various bands: BRS/EBS (2.5 GHz), PCS (1.9 GHz), cellular (850 MHz), and the 700 MHz band. BRS/EBS is well-suited to provide enormous capacity in urban markets where small cell-sizes are required. However, for the vast majority of the U.S., the 700 MHz band has a clear advantage in providing economic coverage, requiring approximately one-tenth the number of cell sites for the same coverage as a network built at 2.5 GHz.

**Figure 6. 700 MHz spectrum has a ten-fold coverage advantage over 2.5 GHz spectrum**

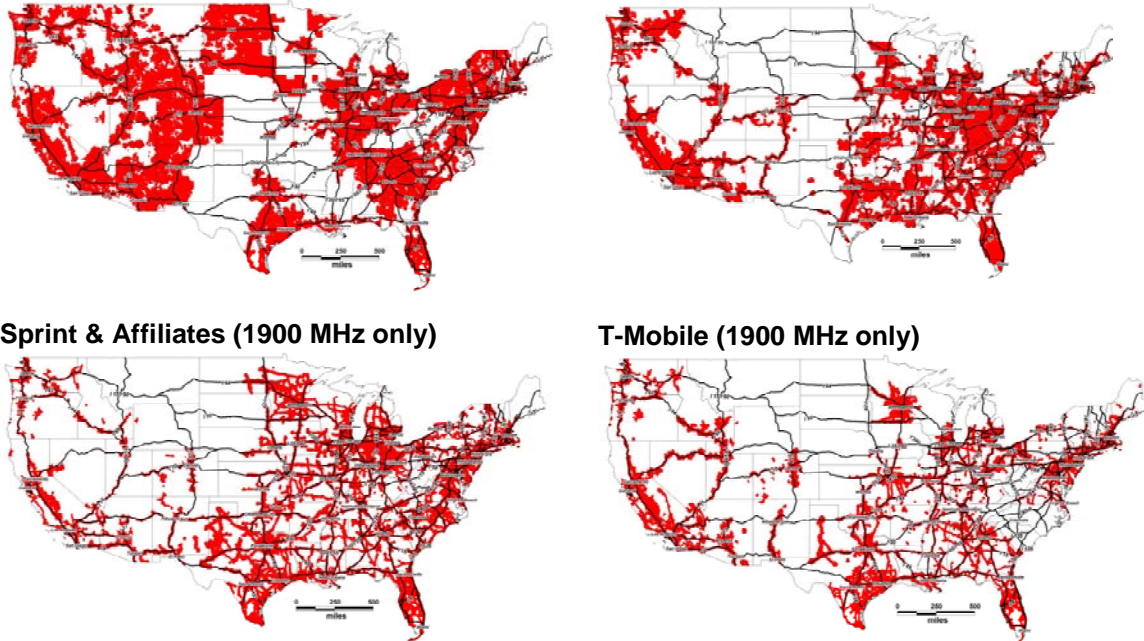


The coverage advantage of the lower frequency spectrum is seen in the coverage maps of the four nationwide incumbents shown in Figure 7. Given this coverage advantage, it is not surprising that the original two cellular incumbents, Verizon and AT&T, have a dominant position in the wireless market.<sup>11</sup>

<sup>11</sup> Both the Verizon and AT&T networks of today resulted from numerous mergers and acquisitions beginning in the 1980s. Initially, there were two cellular incumbents in each region; today there are virtually two cellular incumbents nationwide.



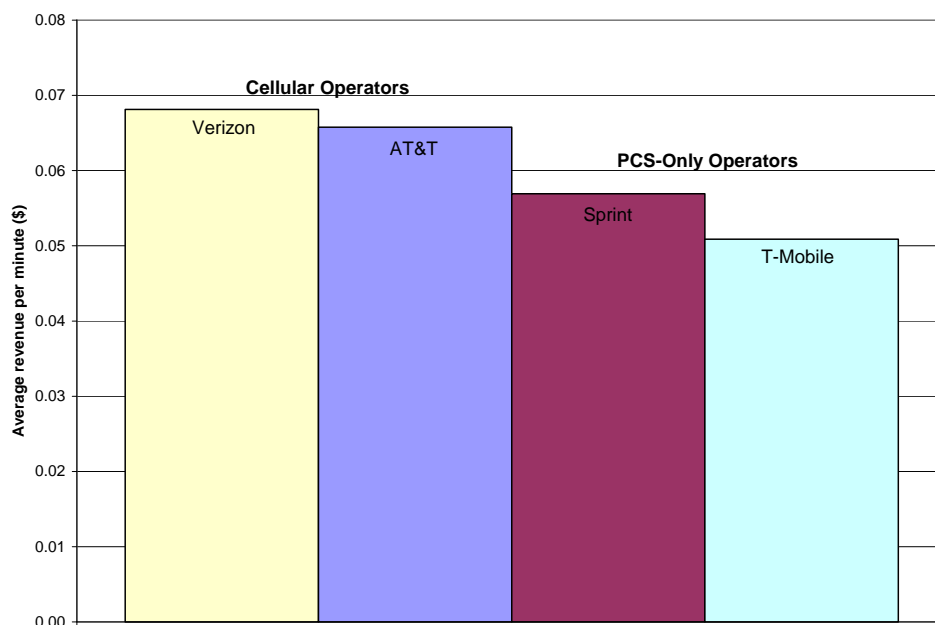
**Figure 7. Lower frequencies result in a coverage advantage**  
**Verizon (850 MHz + 1900 MHz)**      **AT&T (850 MHz + 1900 MHz)**



Source: CoverageRight.

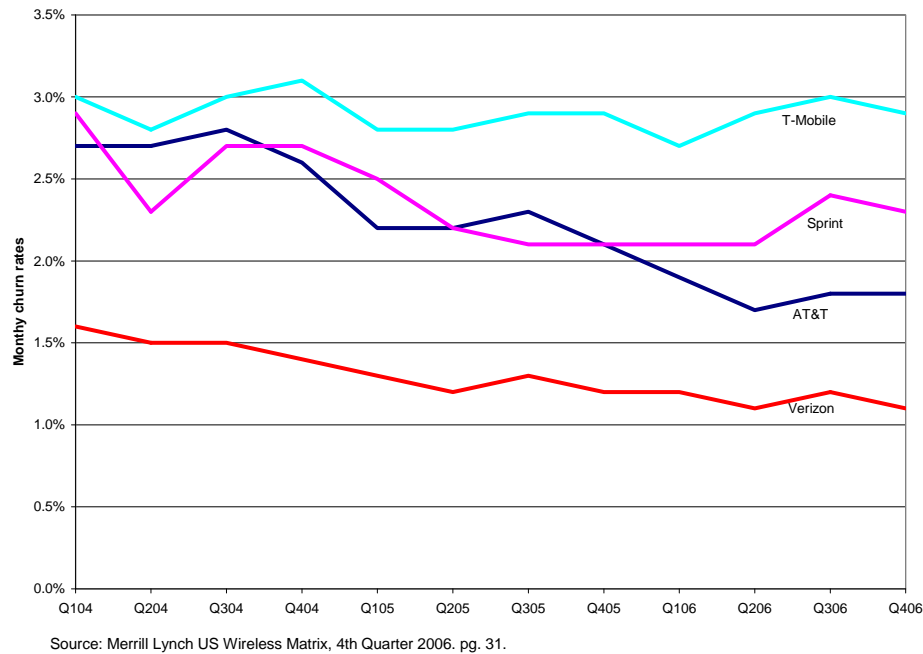
The coverage advantage that Verizon and AT&T enjoy appears to enable them to charge higher per-minute prices than their PCS-only competitors, as shown in Figure 8. It also leads to lower churn, as shown in Figure 9.

**Figure 8. 850 MHz Cellular operators charge more than 1900 MHz PCS-only operators**



Source: Merrill Lynch US Wireless Matrix, 4th Quarter 2006. pg. 31.

**Figure 9. 850 MHz Cellular operators have lower churn rates**



An open-access regime on just a small portion of the newly-available 700 MHz spectrum would make these coverage benefits available to whole classes of new entrants and existing rural/regional CMRS providers. The competitive benefits would be dramatic. Most importantly, these benefits can be realized by requiring open access on only a small portion of the CMRS spectrum. Thus, to the extent that a closed, proprietary network model is seen as most efficient, for some purposes, it will be able to co-exist with the newly available wholesale, open-access provider. Alternatively, the introduction of the wholesale provider may break down the current lock-step movements of the two largest low-frequency incumbents, Verizon and AT&T, to deny access to innovators and bring forth expanded use of all areas of the spectrum wherever the marginal costs justify it. If nothing is done, Verizon and AT&T will have the incentive and ability to prevent efficient entry and attendant consumer benefits.

## **5 An open-access requirement for the E Block will enable many new competitors and benefit consumers**

In this section we argue that a creation of an open-access network available to all interested firms at transparent prices without the threat of holdup would dramatically reduce entry costs for many business models and open entry to a completely new set of firms and services. In our opinion such a network would dramatically change the competition in the wireless and broadband markets and greatly benefit customers. This conclusion accords with the views expressed by the FCC in the Notice that consumer welfare will be well-served by enhanced competition in the wireless and broadband markets, and that competition will be served by making new spectrum available and by offering that spectrum in ways that would allow a variety of business models to compete.

## 5.1 *There are large barriers to entry in the wireless service market*

The main barriers to entry in the market for wireless services are currently the limited amount of usable spectrum and the large fixed costs/capital requirements necessary to acquire that spectrum and to deploy the physical infrastructure for wireless transmission.

By making more spectrum available, the FCC reduces the first barrier to entry. Initially, the FCC made two cellular licenses available in each geographic area. In 1994, the FCC added the broadband PCS spectrum, making it possible for up to seven new large competitors to enter each market. In order to ensure that the incumbent cellular providers would not act on their incentives to frustrate new entry and forestall competition, the FCC set out “spectrum caps” for the auction. The caps were designed specifically to promote new entry by multiple providers in every single geographic area in the country while ensuring that they had sufficient spectrum to pursue efficient business plans.

One may perceive that a lot of spectrum has been sold already and hence the availability of spectrum is not an important impediment to entry. That is wrong. First, as shown in Section 3, the costs of developing a network on the less-scarce high-frequency spectrum are much higher than on the scarce low-frequency spectrum. Second, the prices of spectrum in recent auctions show that even the high-frequency spectrum is highly valuable because of its scarcity—the high auction prices in the AWS auction reflect in part the weakness of competition in the wireless market.

When analyzing barriers to entry, one must account for the fact that, analogous to many other products and services, a wireless service is a bundle of multiple components. In the current market, the main two components are a *national connectivity service* and the provision of retail services to particular consumers. That is, a customer using a wireless device first connects to an available wireless network and then receives retail service via that network. Economists recognize that it is important to think about the components of the product separately in order to inform competition policy.<sup>12</sup> Such “unbundling” of product components led to many successful changes (such as the Carterfone decision and the equal access provisions), promoting competition and innovation, reducing costs, improving quality and extending the range of products and solutions available to customers. We believe that such a perspective on the wireless market can be extremely useful in informing the FCC policy regarding the upcoming auction.

Therefore, we argue that it is important to consider barriers to entry in these two components of the wireless service separately and to consider the feasibility and desirability of separating the “national connectivity services” and “retail services” segments of the market that are currently combined in the offerings of the vertically-integrated wireless providers. Seen in this way, the barriers to entry to the business of providing “national connectivity” are the two barriers discussed above: limited spectrum and the costs of building and deploying the physical infrastructure. With respect to the “retail services,” the main barrier to entry is achieving access to a high-quality nationwide network.

If the current competition policy and the existing market structure are retained, then we worry that entry into the “retail services” segment of the market will remain blocked for all

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<sup>12</sup> There are many markets with similar characteristics. For example, a wired service consists of providing the connection to the home via cable and the service provided via that cable. Residential use of electricity consists of generation, transmission and service. Although such distinctions are clearer in products rather than in services (for example, a computer consists of hardware and software), the same economic reasoning applies to services.

practical purposes. There is currently no spectrum available that would support an economically viable open-access network (other than in some high density areas where it may become economical to use higher-frequency networks). Moreover, the economically optimal policies of current nationwide incumbents in the lower frequencies are to restrict access to their networks. The terms of the previously sold licenses encourage owners to control access to their networks, and as we argued above, their incentives are to prevent entry into service provision in the markets where they operate. As documented by the filings of non-incumbents in the roaming proceedings, these barriers to entry are affecting potential new entrants.

One can view the problem of reducing entry costs/barriers in the “retail services” market as separate from issues about how to organize the current auction, i.e., that the connectivity and access issues could be resolved independently in roaming proceedings after the auction. We disagree. It is important to appreciate that there may be times or products for which vertical integration is more efficient and hence the optimal policy may be to not force universal roaming on all licensees. The question comes down to the tradeoff between potential efficiencies of vertical integration and the dominant low-frequency incumbents’ incentives and ability to foreclose efficient entry in one of the interrelated markets, using the “bottleneck” at one of the other markets. Hence, we argue that right now is the best—or even only—chance of creating a market structure open to both business models and letting competitive forces, instead of regulatory proceedings, choose which products will be offered within each of the business models.

Barriers to entry have become more daunting as wireless has become a nationwide service. Unfortunately, if the same rules previously used to sell spectrum are used in the upcoming auction, the nationwide nature of the product will make it especially easy for the dominant low-frequency incumbents to prevent entry.

Without roaming, a new entrant must aggregate the footprint of a nationwide license and it must amass capital to build a nationwide network; otherwise, it must contract with a nationwide incumbent for expensive roaming or accept affiliation, or be limited to a local niche product. The fundamental fact is that, without acquiring low-frequency spectrum, entry into provision of retail services is blocked by the proprietary networks held by the nationwide incumbents in a concentrated industry.

Importantly, in order to limit new entry, nationwide incumbents do not need to acquire all of the spectrum available in the 700 MHz auction. Because an entrant requires nationwide coverage to succeed, the nationwide incumbent can block entry by buying only local pieces of that spectrum. In fact, even the mere threat of an incumbent using such a bidding strategy could forestall entry because of the attendant exposure risk faced by the entrants. The two low-frequency nationwide incumbents have strong economic incentives to use such bidding strategies to preclude entrants from access to genuinely nationwide roaming.

## ***5.2 A national open-access network can reduce barriers to entry and enable many new business models***

In order to open entry dramatically in the provision of wireless services, we recommend creating at least one national license, the E Block, with an open-access requirement. The winner of this license would be required to be a wholesale-only operator offering ubiquitous connectivity to third-party service providers with transparent pricing, available to any service provider on equal terms and without threats of holdup. Such features create a level playing field

for competition in the wireless market. The open-access network requirements should have two main components:

**Pricing.** To guarantee a level playing field, we recommend a transparent openly available tariff with a menu of contracts and services. This tariff is required to be non-discriminatory, enforced by Most-Favored-Nation provisions that ensure no discrimination by the identity of the retail service provider. Because the market can support many different business models, we envision different firms wanting different forms of contracts and services. Hence we expect that the tariff's menu of options can depend on economic variables, for example the interconnection standard, congestion conditions, location, service priority, etc. As an alternative to a fixed tariff, an auction mechanism might provide additional price transparency.

**Access for variety of technologies.** The operator of this network should allow various protocols and devices to connect to the network. Since it is not possible to foresee how the technology will evolve in the future, we recommend against imposing narrow technical requirements on access. If the FCC prevents the operator from withholding or hoarding the spectrum (in ways discussed in the next section) then the operator will have the right economic incentives to offer such ubiquitous connectivity.

The chief benefit of an open-access network is that it reduces the cost of entry into provision of nationwide services by unbundling “national connectivity” from “retail services,” namely by separating them into two markets. Such a solution promotes new mixed-entry models, in which a firm acquires local licenses for spectrum capacity to provide coverage in high demand areas, and then is able to provide roaming coverage via a contract with the operator of the open-access network.

The opportunity to contract on non-discriminatory terms with the operator of the open-access network reduces dramatically the investment and fixed costs necessary to implement a wireless service. It also allows unbundling of the business of technical operation of the network (and providing access) from the business of providing retail services to customers, which in turn allows firms to focus on their core competences—to run smaller or more customized operations.

As we argued before, the 700 MHz spectrum, due to its superior propagation properties, offers a unique opportunity to create such a nationwide platform that would enhance competition by enabling entry of local retailers with new business models. Using a high-frequency spectrum to provide regional or nationwide coverage is a daunting economic prospect. As mentioned covering 95% of the population with a 700 MHz network requires approximately one-tenth the number of sites required using 2.5 GHz spectrum. Therefore, it is crucial for the FCC to introduce open-access provisions in this auction for some block of the 700 MHz spectrum to gain true nationwide open access and competition.

The establishment of an open-access network increases the value of regional and local licenses held or newly won by smaller operators. It dramatically reduces their entry costs, allowing smaller operators to buy spectrum and develop the network infrastructure only in their core geographic area. Assured access to nationwide roaming via contracts on non-discriminatory terms enables these operators to compete for retail customers on terms comparable to those of the large incumbents with proprietary nationwide networks.

An open-access network as defined above also increases the social value of abundant high-frequency licensed and unlicensed spectrum. It does so by allowing owners of networks

operating in those bands to combine local high-frequency capacity with nationwide roaming coverage at 700 MHz. For example, the EBS/BRS bands provide nearly 200 MHz of bandwidth around 2.5 GHz, but the high frequency currently limits deployments to more densely populated areas. Using a 2.5 GHz network with a 700 MHz open-access network allows a 2.5 GHz operator to offer the best of both worlds to customers using dual-band devices: ample capacity in densely populated areas (via the 2.5 GHz spectrum) and competitive coverage/reliability (via the 700 MHz spectrum). Essentially the open-access model allows the emergence of “synthetic” multi-band operators via wholesale agreements, to mirror the multi-band networks of Verizon and AT&T, who pair their PCS licenses with their valuable 800 MHz licenses. The difference, of course, is that the open coverage network would be broadly available on a wholesale basis, unlike the closely-held low-frequency facilities of the incumbents.

Currently, as evidenced by the Commission’s roaming proceeding, smaller operators desire access to nationwide roaming, but the nationwide incumbents actively oppose the Commission’s action to mandate such roaming. By instituting the open-access network on the E Block, the Commission solves this problem with limited intervention in the market. At the same time, it leaves most of the spectrum under the current rules that favor business models dependent on vertically-integrated proprietary networks. This policy would let the market eventually decide whether both models are viable in the long run.

To be concrete, we describe a few examples of business models that an open-access wholesale-only license enables:

- a) A small service provider can provide primary service in a smaller geographical area and still offer a nationwide service to its customers. This provider can build local networks for capacity in areas of high demand and rely on coverage from the open-access network in other areas with low demand from its customers. This business model intensifies competition in high-density areas without replicating infrastructure in low-demand areas—which would be economically inefficient.
- b) A startup or an existing small firm that is introducing a new service or wireless product can create innovative devices or services without fear of being blocked by the incumbent providers. The devices and services could be purchased at retail by any user and activated on the network, without the prior permission of the carrier. The device maker might even purchase wholesale network capacity and bundle it into the retail price of the device, so that end users do not have to think about network connectivity—they just turn on the device and it connects.
- c) Operators in higher-frequencies (e.g., in the 2.5 GHz bands) can bolster their networks with a low-frequency roaming partner that can more efficiently cover lower density non-metropolitan and rural areas.
- d) Unlicensed operators can obtain recourse to licensed spectrum as a “safety net” for in-market services and roaming out-of-market.
- e) The Mobile Virtual Network Operator (MVNO) becomes a viable retail service model—we envisage firms entering the market for wireless services without acquiring spectrum. For example, some firms can use this mode of entry to customize their services to the needs of small customer groups. Importantly, a wholesale-only provider has incentives not to limit its supply of network capacity to MVNO wholesale customers.

### **5.3 *The open-access benefits and easier entry will lower prices through competition***

Retail consumers will be the ultimate beneficiaries of new business plans. Intensified competition lowers prices and strengthens incentives for service innovations. Instead of possibly zero (if the Commission declines to prevent dominant low-frequency incumbents from foreclosing entry) or one new entrant, the open-access requirement leads to the potential of multiple new entrants competing for retail customers with a variety of business plans and services.

The 1.9 GHz spectrum is presently the “marginal spectrum,” meaning that wireless prices are largely determined by the cost of providing service using frequencies in the 1.9 GHz spectrum. The better propagation properties of the low-frequency spectrum translate to lower marginal costs to develop wide-area network connectivity. Hence, if access to a network using the more efficient spectrum becomes open, the price of access will be determined by that lower cost, leading to lower prices, especially in low-density and rural areas.

Increased competition from new retail service providers puts pricing pressure on existing operators and leads to price reductions across the whole market. Indeed, this price pressure is the main reason for the incumbents’ incentives to prevent the development of an open-access network.

Increased price competition provides additional incentives to find cost-saving solutions both in network operation and in provision of network services, leading to additional price decreases at the retail level. As experience has shown in many industries, the threat of losing customers to competitors provides strong incentives to innovate, and it encourages firms to reduce costs, develop higher quality products, and introduce a wider variety of products and services.<sup>13</sup>

### **5.4 *The open-access benefits and lower entry barriers will stimulate innovation***

An open-access network assures connection to a nationwide network on non-discriminatory terms, and protects entrants from future hold-up actions by dominant incumbents. This assurance creates new opportunities for entrepreneurs and small businesses, and unleashes their creative abilities in devising products and services. Price competition and the ubiquitous coverage offered by the open-access licensee forces firms to differentiate their products and to compete in quality and variety instead of the current struggle to gain access to wide-area coverage from the four incumbents with nationwide networks.

A prominent example of how the existence of an open-access network creates incentives for innovation is the Internet: free entry to the Internet was undoubtedly one of the engines driving rapid growth of the Internet. Many firms succeeded on the Internet because they knew that if they came up with a good business idea, the open nature of the Internet with the standard TCP/IP protocol assured them a fair chance to succeed. That knowledge reduced substantially the risk of investment in developing the idea into a commercial product and spurred innovation in both services (e.g., the web, email, voice over IP, social networking, search, music stores, video sites) and devices (laptops, desktops, WiFi devices, webcams, etc.).

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<sup>13</sup> See for example, N. Economides, K. Seim, and B. Viard, “Quantifying the Benefits of Entry into Local Phone Service.” Working Paper, Stanford University, August 2006.

In general, the incentives to innovate to improve products are different under unrestricted entry and restricted entry conditions. In a regime of restricted entry, an incumbent firm internalizes the consequences of new products cannibalizing old products; hence, after initially developing viable products, an incumbent has less incentive for further innovation than new entrants have. In contrast, in a regime of unrestricted entry, a firm runs the risk that innovation by competitors may offer superior products—a threat that is reduced in a regime of restricted entry. As a result, protection against entry can promote innovation initially at the expense of stagnation in the long run. We view the wireless market as beyond its infancy stage; hence, we are apprehensive that the incentives of incumbents are now to protect their current products and business plans, rather than to invent new products that would replace them. Therefore, we put greater weight on the importance of continued innovation in this market, and favor provisions that encourage entry of retail competitors.

In the wholesale component of the market, one might worry that a vertically-integrated firm could capture more of the benefits of its innovation than an open-access network operator, and as a result the open-access provider will have less incentive to innovate. In our opinion, however, down-stream competition among retail service providers enables the open-access network operator to capture part of the value added that it creates by investments and innovations in the access technology; hence this concern is of second-order importance. The competitive force that is most important in this case is the competition among network operators—both open access and closed-proprietary. We believe that competition among them will force innovation to keep their businesses viable.

Competitive pressure from an open-access operator, and from retail service providers who buy access from it, spills over to the other parts of the spectrum where nationwide incumbents must keep improving their products to compete with entrants.

An additional important advantage of an open-access network is that, by enabling retail entry, it allows market forces to choose the solutions that best reflect the preferences of retail customers. This leads to efficient selection among available technologies and the retail products and services they enable. Because technical proposals vary widely, evaluation of different solutions is difficult without a market test. One cannot expect a perpetually closed set of dominant incumbents to always produce the best ideas or to buy the best ideas from third parties—entry barriers affect not only incentives to innovate but also restrict what ideas are brought to the market. Opening access will enable the market to choose from a much larger set of possibilities.

Finally, the reduction in the fixed costs of entry—since open access enables an entrant to avoid the cost of acquiring regional or national licenses and building out a wide-area network—makes more business plans financially viable, and leads to a wider variety of services available to retail customers.

Summing up, we see many benefits of an open-access license for the incentives to innovate in both the “national connectivity service” and “retail services” segments of the market. Moreover, it is possible to create most of the benefits from open access by creating just one block that serves this crucial role. By creating an open-access license and while not forcing open access on the whole spectrum, the FCC creates an opportunity for different categories of business models to co-exist. Different forms of innovation will use the channel where they will be most profitable.



## **5.5 Nationwide open access and unrestricted entry creates additional competition for broadband**

Finally, intensified competition in wireless services will impact the related market for broadband services, leading to similar benefits in that market. Voice transmission has already shifted substantially to mobile devices. Broadband will likely follow this path too—mobile wireless broadband is likely to grow. Hence the proposal to create an open-access license must be considered also in terms of its benefits for the broadband market and the services it provides.

Although a mobile broadband connection may not have as high capacity as a fixed-line connection, mobility may make it a viable substitute for fixed-line broadband usage, just as mobile voice has substituted for fixed-line voice usage. Even if a wireless connection is slower than a fixed-line connection, mobility may offer enough value for users to be interested in using it together with, or instead of, the wired connection. Many customers are switching to mobile voice service (to complement or substitute fixed-line service) despite the superior quality of fixed-line voice service.<sup>14</sup> One expects the same to happen in part of the mobile IP data market. That is, even though slower than fixed-line broadband, the wireless product can provide substantial value to some customers.

As we noted above, competition in broadband is quite limited. Competition will be improved if the FCC creates multiple “pipes” into homes, as well as portable ones. An open-access network enables more modes in which customers can use broadband services. Moreover, the 700 MHz spectrum allows for better coverage, creating for some customers their first broadband connection. By providing another alternative to fixed-line broadband, we anticipate that mobile offerings will introduce more price competition to the market for broadband services.

To create these benefits for customers and wireless businesses in the most efficient way, the open-access network should be built on a nationwide scale, both to exploit scale economies, and to bypass negotiating with various national and regional network owners, which would introduce unnecessary transaction costs and vulnerabilities to holdup. Also, the open-access network should have wide coverage to achieve universal service even in areas with very low average demand. In such areas it is not economical to build multiple networks, but still occasional connections are beneficial for customers. To achieve that goal it is necessary to auction the E Block as a nationwide license. Moreover, it is crucial to locate the open-access license in the 700 MHz band because its superior propagation properties make it the most economical spectrum to develop for wide-area broadband coverage. Finally, since there are large geographical areas where it is not economical to develop more than one network, it is efficient to bundle the development of the open-access network with the public-safety network. We describe the important public safety issues later.

## **6 Block size and package bidding are important features of the competitive plan**

There may be a variety of different business plans that providers want to pursue. Both the design of the band plan and the specification of the auction rules can affect the viability of different business plans. Generally, most consumers demand nationwide coverage even if the vast majority of their use is in local areas. The vast majority of consumers have signed up with

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<sup>14</sup> See CTIA, *Semi-Annual Wireless Industry Survey*, p. 10. At the end of 2006, there were 1.8 trillion wireless minutes with annual growth of over 20%.

one of the providers offering nationwide coverage, even though the local-coverage-only firms typically offer cheaper plans to niche customers (Leap and Metro PCS are examples). It makes sense therefore to allow a new entrant to purchase spectrum in a way that enables it to compete with the existing nationwide providers.

There may also be some providers who can offer service to consumers efficiently with a local business plan. Such smaller coverage areas will be more viable and valuable if the Commission creates the open-access license, because then local providers can use the guaranteed nationwide roaming partner to provide complete products. Hence we think that some spectrum should be made available with blocks divided into smaller geographic areas.

In particular, we suggest offering the nationwide open-access E Block in conjunction with smaller geographic areas on the C and D Blocks. That way, bidders in the auction can acquire small geographic areas in those two blocks. However, bidders for the C and D Blocks may have high-value nationwide business plans and face high exposure risk. To allow them to compete successfully, we strongly suggest allowing limited package bidding that will enable efficient aggregation of licenses.

While SpectrumCo was able to obtain a nearly-nationwide block of spectrum in the AWS auction, it is not clear that such a bidding strategy can be replicated in the 700 MHz auction, nor would it necessarily have been an appropriate strategy for another bidder with a different business plan and a different risk of exposure if the aggregation had failed.

Adding package bidding on the C and D Blocks can solve a potentially severe problem that apparently frustrated at least one potential entrant during the AWS auction. (Purportedly, the consortium of DBS providers wanted a nationwide block of spectrum but was unwilling to undertake the risk of buying some licenses and overpaying for others to complete its desired package.) Package bidding would have enabled DBS to bid on smaller license blocks without risking a failed national aggregation.

Package bidding has another benefit for new entrants. This benefit arises because package bidding can increase substantially the cost to dominant low-frequency incumbents of blocking a nationwide strategy. Consider a new entrant who needs each of six licenses. A dominant low-frequency incumbent could bid on just one of the six to block entry. By raising the price of each of the six licenses sequentially, it could raise the price of the package enormously while only risking purchasing  $1/6^{\text{th}}$  of the entire package. The threat of such strategic blocking by a dominant low-frequency incumbent could be sufficient to make a new entrant drop out of an auction before participating seriously. Package bidding can ameliorate that risk—if the incumbent is forced to bid on a nationwide package, then it risks buying the package, and it must spend six times as much money to increase the total price to the same level.

Package bidding creates a “threshold” problem whereby bidders on smaller licenses may have a higher valuation than the package bidder, but they cannot easily coordinate their bids to increase them substantially, since each bidder wants to act as a free rider on bid increases offered by the other bidders. The FCC has incorporated rules in its auction procedures to minimize such problems by requiring bid increases.

Another concern about package bidding is that in general it can be very complex. We think that there is great potential value in a full package bidding system, but if such a system is too complex or risky for this auction, it would still be good to use a limited form of package bidding such as that put forth by Milgrom and Wrege and by Rosston in earlier comments to the

Commission. The upshot of their proposals is to allow a limited number of non-overlapping packages and a nationwide package, and a combined package across the D and F blocks. These limited packages are likely to eliminate a large part of the exposure risk without adding substantially to the complexity or riskiness of the auction.

## **7 Anonymous bidding will promote competition and enhance auction revenue**

There are advantages and disadvantages to balance in deciding about the bid disclosure policy during the auction. Revelation of bidders' identities can in some cases allow more accurate value assessments by bidders during the auction. Without knowing who is bidding on complementary licenses, a bidder may not be able to know what technology choices would be made. This lack of information could, for example, impact valuation because of an expectation of roaming.

However, there are a number of reasons why that consideration may be less important in general for the FCC now than it was in 1994 when the FCC first began auctions of spectrum. First, the technology is more advanced and established so that new entrants will have a reasonable idea of potential roaming partners even without knowing who is bidding on particular geographic areas. Second, the presence of the E Block and the open-access requirements reduces the need to know about other bidders if there is a carrier required to allow roaming at posted prices.

There are two major problems with revealing bidder identities in the auction: it gives bidders the ability to signal to each other, thus reducing auction revenues and possibly resulting in an inefficient assignment of licenses; and, it may make it easier or less costly for dominant low-frequency incumbents to target new entrants and thereby prevent additional competition.

In general, the greater the number of bidders, the more competitive the auction will be and the less concern there should be about "signaling" during the course of the auction. The FCC recognized this concern when it set forth rules covering the revelation of bidder identities in the AWS auction contingent on the eligibility ratio being greater than three. However, the magnitude of the eligibility ratio is not necessarily inversely related to incumbents' ability to forestall entry. For example, if all entrants need specific licenses or a minimum scale to compete efficiently, even a high eligibility ratio would not necessarily limit a dominant low-frequency incumbent's ability to bid strategically to deny entrants the necessary licenses or raise the prices of those licenses. In fact, simply knowing that they might be subject to such strategic bidding in the auction might cause entrants to hold back in the auction or decline to participate at all, thereby satisfying the incumbent's plans at no cost.

Because of the limited upside to revelation of bidder identities and the possible harm to competition and efficient license assignment, we recommend that the Commission not reveal bidder identities during the auction.

## **8 Bidding credits for new entrants will promote competition**

One of the goals of the Commission is to sustain as competitive a market as possible. One tool to help new entrants would be to use a bidding credit. Bidding credits can make a new entrant more competitive against a dominant incumbent in the auction and thereby affect the competitiveness of the subsequent market. However, we understand that the statute authorizing bidding credits only allows their use to promote the entry of small businesses and other

“designated entities.” Although it would be better to have bidding credits for new entrants in general, using them for small businesses would help small new entrants compete and provide similar benefits on all blocks.

It is important to understand that the price paid in the auction should not affect the price for service later, since the auction price is a sunk cost. So, at first glance, one would not expect bidding credits to have an impact on the prices for wireless service. However, bidding credits may actually have a large impact on prices if bidding credits change the winner of the auction from a dominant low-frequency incumbent who wants to protect its existing market share and income stream, as compared to a new entrant who wants to acquire customers and therefore prices more aggressively.

With bidding credits there could be a concern that a small business entity that qualifies for a bidding credit may act as a “front” for a larger entity that would not qualify or would undermine the open access model adopted by the Commission. We think that targeted requirements could be placed on the E Block that would be sufficient to ensure that an entity benefiting from the bidding credit would be consistent with the Commission’s goals for that slice of spectrum.

There has been some discussion that a bidder’s eligibility for bidding credits should depend on its operating its own retail service on 50% or more of its spectrum. Such a restriction is viewed by some as being necessary to discourage fronts. To us, this is not necessary, and in fact is counter productive, given the wholesale mandate we propose for the E Block and the accompanying restrictions on self-dealing. Such a requirement might well defeat the entire purpose of bidding credits—to promote small businesses and, most importantly, to get new competitive entry.

Consistent with economic theory and empirical evidence, bidding credits typically *do not* cause a reduction in auction revenues.<sup>15</sup> Rather the bidding credits typical motivate the participation of small entrants, which intensifies competition and raises auction revenues. This tendency is seen in Table 2, which displays auction prices net of bidding credits for each of the broadband wireless auctions.

**Table 2. Small business share of winnings and net prices for broadband auctions**

No.	Auction	Spectrum (GHz)	Bandwidth (MHz)	Start Date	Number of licenses won			Quantity of spectrum (MHz-pop)			Net bids (\$M)			Net price (\$/MHz-pop)
					Total	DE	Share	Total	DE	Share	Total	DE	Share	
4	Broadband PCS A and B Block	1.850	60	12/5/1994	99	0	0%	13,553	0	0%	7,019	0	0%	0.52
5	Broadband PCS C Block	1.895	30	12/18/1995	493	493	100%	7,577	7,577	100%	10,072	10,072	100%	1.33
10	Broadband PCS C Block Reauction	1.895	30	7/3/1996	18	18	100%	466	466	100%	905	905	100%	1.94
11	Broadband PCS D, E, & F Block	1.865	30	8/26/1996	1472	598	41%	7,577	3,204	42%	2,517	761	30%	0.33
12	Cellular Unserved	0.869	25	1/13/1997	14	0	0%	31	0	0%	2	0	0%	0.06
22	C, D, E, and F Block Broadband PCS	1.885	30	3/23/1999	302	277	92%	2,703	2,390	88%	413	390	94%	0.15
35	C and F Block Broadband PCS	1.890	35	12/12/2000	422	422	100%	4,029	4,029	100%	16,857	16,857	100%	4.18
45	Cellular RSA	0.824	25	5/29/2002	3	0	0%	5	0	0%	16	0	0%	3.22
58	Broadband PCS	1.850	30	1/26/2005	217	47	22%	2,136	668	31%	2,043	632	31%	0.96
66	Advanced Wireless Services (AWS-1)	1.710	90	8/9/2006	1087	215	20%	25,706	2,192	9%	13,700	551	4%	0.53

**Notes**

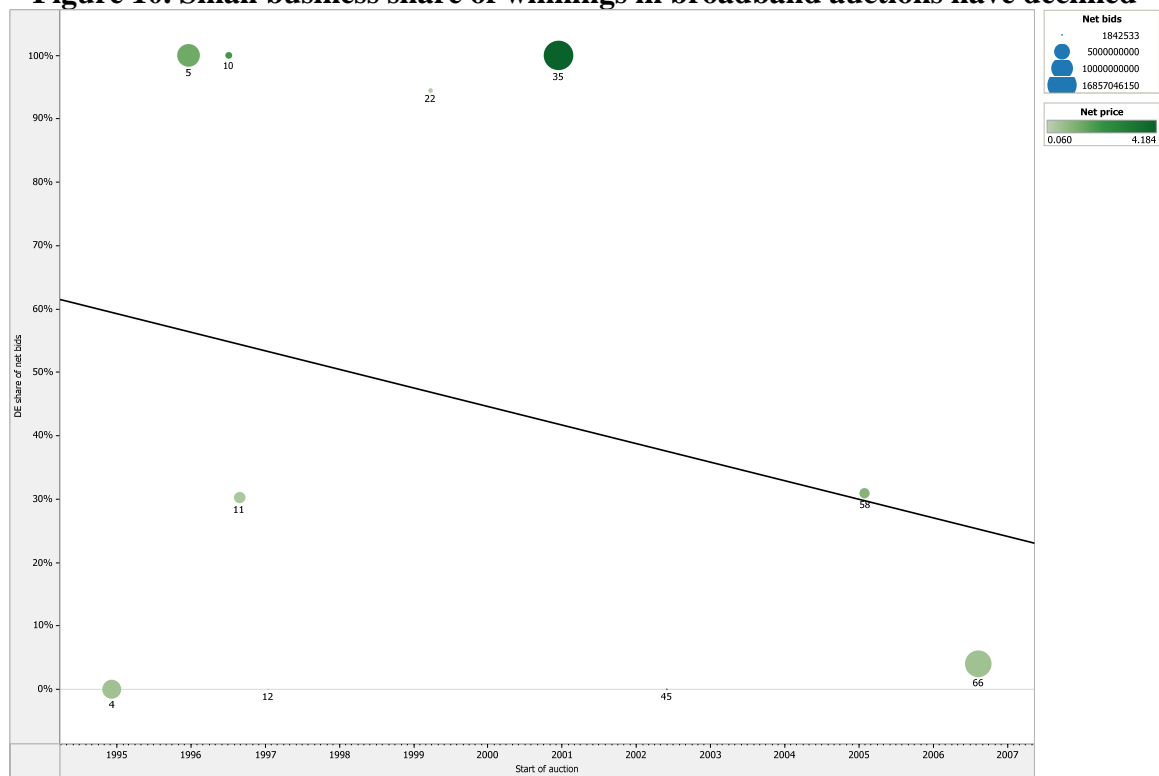
All data from www.fcc.gov. All auctions are simultaneous ascending.

Spectrum is the location of the first band in GHz. Bandwidth is the sum of all bandwidths in MHz.

DE includes all winnings by designated entities (small businesses). Share is the share of winnings by DEs. Net bids are gross bids less bidding credits for DEs.

<sup>15</sup> Peter Cramton and Ian Ayres, “Deficit Reduction Through Diversity: How Affirmative Action at the FCC Increased Auction Competition,” *Stanford Law Review*, 48:4, 761-815, 1996.

**Figure 10. Small business share of winnings in broadband auctions have declined**



Source: FCC. Designated Entity share of net bids in broadband auctions. Color depth shows net price. Size shows net bids. The labels indicate the FCC auction number.

Figure 10 presents graphically the data of Table 2. Each dot represents an FCC broadband auction. The auctions are plotted over time (the x-axis). The height of the dot is the small business share of the winnings in net bid terms. The size of the dot is the size of the auction, again in net bid terms. The color depth indicates the net price (\$/MHz-pop). Notice that the darker dots (higher prices) tend to have greater small business participation. Finally, the downward sloping trend line indicates that the small business share of winnings has declined over time.

One explanation for this decline is the dominance of the vertically integrated nationwide operators. With the absence of a wholesaler offering nationwide roaming, there is little room for the small regional operators. We think that this is part of the reason why only 4% of the AWS spectrum was won by small businesses.

## 9 Public safety can benefit from cooperation with the E Block licensee

In a perfect world, there would be an economically efficient allocation of spectrum, and public safety providers would have the resources to compete for the use of spectrum in the same way that other providers compete for scarce spectrum, and in the same way that public safety agencies buy other supplies such as cars, ambulances and personnel. In addition, spectrum policy would be such that the supply of spectrum, and the network connectivity that uses it, would not be artificially limited.

However, there are numerous constraints that depart from that ideal situation. First, public safety agencies are generally awarded exclusive use of specific blocks of spectrum that are not transferable. Second, public safety agencies are not awarded resources sufficient to acquire rights

to use additional spectrum, nor to build and operate high quality networks on the spectrum they have. Finally, achieving nationwide compatibility, while extremely useful, may be difficult to achieve with the balkanized structure of public safety agencies across geographic areas and across services within the same geographic area.

In our view, these constraints imply that the public safety can be well served by creating the basis for a public-private partnership that has the following elements:

1. The E Block licensee will build a nationwide interoperable public safety network subject to requirements negotiated in a network sharing agreement. Broad requirements and a mechanism for ongoing coordination and monitoring should be established before the auction.
2. The E Block licensee is allowed to use both the private spectrum and the excess parts of the public safety spectrum to provide service to both groups of clients, with the public safety agencies having priority access to the public safety network, and to additional spectrum in major emergencies.
3. Public safety would control the spectrum allocated to public safety, and retain the option to pursue alternatives other than a shared network with the E Block licensee.

There are several implementation and technical issues regarding such a plan. In this paper we focus on the main economic issues. In particular, the public safety part of the proposal can create the following economic benefits:

1. Solve the coordination problems faced by diverse and decentralized public safety agencies.
2. Achieve economies of scope in construction and operation of the network.
3. Achieve additional savings and more efficient use of spectrum by shared use of the two parts of the spectrum by the public safety agencies in times of emergency, and by private users at other times, leveraging the different demand patterns of the two groups of users.
4. Bring competitive pressure to reduce the pricing of network access for the public safety users.
5. Provide efficient financing for the buildout and operation of the public safety network.

### ***9.1 The FCC can help solve coordination problems***

Until now, development of a public safety network has been controlled by local organizations. It is very difficult for them to develop the network efficiently for three major reasons: 1) Being decentralized and fragmented, they face severe coordination problems in agreeing on timelines, technical specifications, cost sharing etc.; 2) Many agencies face tight budgets that would lead to delays in rolling out a truly nationwide network, and delays in adopting the equipment and standards that would be optimal for public safety across the country; 3) As we explain below, the costs of building a separate public safety network are much higher than necessary, making the financing problems much worse.

Under the public safety part of the plan, there would be a single nationwide network with a common technology. All public safety agencies across the country would be able to communicate with each other and take advantage of the additional spectrum during times of emergency. By centralizing the decision-making, the plan provides a solution to balkanized and incompatible public safety systems.

Without a nationwide standard and guaranteed interoperability, if the Menlo Park (California) Search and Rescue squad were again sent to New Orleans, it could not be sure that its radio equipment would work in New Orleans at all, or be able to communicate directly with workers from the various New Orleans agencies. More commonly, users within one jurisdiction are guaranteed access to the network if they cross into neighboring jurisdictions. A nationwide system could have all of these features built into the software so that different groups could be established “on the fly” and have many other features, depending on public safety requirements. National standardization will also reduce the cost of public safety equipment, particularly on an open-access network where vendors are free to introduce new devices and to compete for public safety agencies’ business.

The budget constraint problem should be ameliorated as well. Because the E Block licensee pays for the upfront capital costs, public safety will not bear the cost of initially constructing the network. In addition, because each public safety agency will be able to choose the most favorable rate plan among those available to commercial customers, even the smallest public safety agency will be protected by competition for the price it has to pay for service, since other networks will compete with the E Block licensee for retail providers.

## ***9.2 There are large cost savings (economies of scope) from building and operating a joint network***

Estimates of costs to build a stand-alone robust high quality public safety wireless network exceed \$10 billion. These estimates include only the construction of the network; public safety agencies would also be required to pay for the operation of the network as well.

Economists use the term “economies of scope” for situations where a single provider can produce two (or more) different goods or services using fewer resources than would be required for two different entities to each produce one of the two goods or services.

According to the proposed plan, the E Block licensee would build a single network to provide two different services: public safety radio and commercial radio services that will provide the full panoply of voice, data and some video. There are some differences between the two services in addition to the identity of the end user. However, those differences appear to be easy to incorporate in a single pervasive network. With a single network, the provider would be able to share cell sites.<sup>16</sup> The economies of scope in network construction mean that while the cost to the E Block licensee of building the combined network may be more than the cost of building a single network alone, it should be far less than the cost of building the two networks separately.

Second, there can be operating cost efficiencies. For example, sharing of the operating systems, maintenance and personnel would reduce the cost of operating the system.

## ***9.3 It is more efficient to share the spectrum***

It is apparent that public safety use of spectrum during times of emergency has very high value. Most of the time, public safety use of the spectrum is not so critical. On the other hand,

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<sup>16</sup> Independent tower operators allow completely separate networks to share cell sites in some cases. However, there may be some economies from integrating the sharing of cell sites, negotiation, and sharing backhaul and other factors within a single network.

one expects that most of the capacity allocated to public safety would not be used much of the time. However, there are times when even their allotted capacity would be insufficient. Hence it may be extremely valuable to have additional spectrum available for public safety agencies. The plan proposes that public safety has access as needed to an additional 10 MHz of spectrum, nearly double the amount of broadband spectrum available to public safety under the current 700 MHz plan.

Public safety agencies have different usage patterns than retail customers: very high demand (and use-value) in emergencies, and much lower demand when there is no emergency. Thus there is an opportunity to share bandwidth to increase the efficiency of usage of the spectrum by allocating additional bandwidth to public safety in times of emergency and shifting unused bandwidth from the public safety to commercial use when there is excess capacity on public safety spectrum.

The ability to make better use of its spectrum during times when it has excess capacity should be a major benefit to public safety agencies. To assure this, they should obtain guarantees of priority access to spectrum when needed, and access to additional spectrum when it is critically needed and highly valued.

Sharing the network is also a source of additional economies of scope that offset the costs of developing the network. In particular, with a limited bandwidth, to provide peak-load capacity, it is necessary to split cells and incur large fixed costs for capacity that is rarely used. The capacity of the private network can substitute for these additional cells and lead to additional savings on the order of 40% fewer cells needed to achieve the same performance.<sup>17</sup>

#### ***9.4 Competition for retail customers will spill over to the public safety pricing***

Operators of public services often face weak competitive pressures because their customers rarely have the option to “vote with their feet” by changing their service providers. The lack of competitive pressure can lead to low quality and reduced incentives to innovate. The benefits of competition have been reaped mainly by programs to procure public services on the open market and let firms compete in price and customer satisfaction. However, such direct competition in the provision of the public safety network is not possible beyond the initial auction because of the high costs of developing the network. However, the operator of the E Block will be exposed to continued competitive pressure on the interconnected commercial part of the spectrum: it will need to compete for consumers (who value coverage and reliability) with operators of other commercial networks. That pressure will force it to strive for quality to retain commercial wholesale customers, and the quality and low prices will spill over to the public safety network. To guarantee that the public safety agencies have access to at least as good prices as the private sector, we recommend that the public safety agencies should be granted Most-Favored-Nation provisions that let them choose terms for comparable services that the E Block operator offers private firms. This means that public safety will, for the first time in wireless services, obtain the benefits of competitive market pressures.

In our opinion one of the key components of a good public safety solution is that public safety retains the option to decline the deal and instead to use the spectrum designated for public safety without any reliance on the public-private partnership. That way, public safety can limit

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<sup>17</sup> See Comments of Access Spectrum, LLC, Columbia Capital III, LLC, Pegasus Communications Corporation, and Telcom Ventures, LLC, filed with the FCC on 29 September 2006.



the deals it is willing to consider and accept only those in which it gets a better deal than it currently has. If public safety decides that the E Block licensee is not offering good enough terms, it can decide to consider other alternatives.

### ***9.5 The plan achieves more efficient financing of the public safety network***

Finally, the cost of the system would not be financed by inefficient taxes. Most public finance scholars estimate that the cost of taxpayer financing of projects is very expensive, on the order of \$1.30 for each \$1 financed. There are two reasons why the proposal will save taxpayers money. First, the cost savings outlined above should go directly to the Treasury and public safety agencies via the price in the competitive auction. Public safety will save money on service because competition for service pricing on the commercial side will give them similar competitive benefits. Second, from an economic viewpoint, the remaining costs will be financed via the auction since the winner of the E Block will be obliged to build the network without any post-auction subsidies and will take these costs into consideration in bidding for the license. Importantly, such financing will be an upfront cost, equivalent to a lump-sum tax with minimal distortion, instead of a distortionary income or other tax, and that will reduce substantially the inefficiency of financing. Both of these savings will redound to the benefit of the American public.

### ***9.6 For-profit companies will be involved in construction and operation of any large public safety system***

Regardless of what plan is adopted, there will be substantial involvement of “for-profit” companies in the design, construction, and operation of any public safety network. Moreover, thanks to economies of scope, the total cost of the development of the network by bundling it with the E Block will be lower.

We understand that there is concern that a “for-profit” company that is also operating a commercial wireless network will not provide the level of quality, coverage, and security that is needed by public safety agencies. For any public safety network, there will be tradeoffs between expense and quality. To get higher quality, a more robust network requires more expenditure on towers, radios, etc. The key is for public safety entities to be involved in the network design and operation planning regardless of who is building and operating the network.

It is also important to note that public safety agencies are unlikely to be the ones to build any radio network. Any such network will almost assuredly have substantial “for-profit” involvement. The vast majority of current public safety systems are based on radio systems designed by for-profit companies. The big difference in the current proposal is that the E Block licensee will want its network to be commercially viable as well as be able to provide adequate public safety services. The benefit of this aspect is that commercial customers are likely to be satisfied with the high quality and reliability of the public safety network. One concern is that the E Block licensee might want to build only a commercial system, not a more robust public safety system able to cope with extreme emergencies. This is why it is critical to ensure that public safety agencies are involved early in the negotiations and in the network design. In this way, they can ensure that the network meets their needs.

## **9.7 *Pre-auction planning of implementation is important***

It will be useful for the public safety agencies to set out requirements in advance of the auction so that bidders can understand the commitment entailed in the E Block license, and thus be able to value the block appropriately. These requirements should provide sufficient detail so that bidders can judge the magnitude of the additional cost that will be required to satisfy public safety agencies. Winning the E Block would oblige the licensee to build a network that meets the minimum requirements.

We should be clear that the nature of procurement in general and wireless networks in particular means that such minimum requirements will entail substantial ongoing coordination between the network operator and the public safety agencies. However, we stress that this is the general nature of commercial contracts and hence such coordination and on-going monitoring would be required in any public safety network construction, whether it is the direct result of the auction or is later procured by safety agencies.

## **10 Conclusion**

Since 1994 two factors have thwarted the Commission's admirable efforts to sustain competition in the wireless industry. One is the unanticipated importance of roaming, and more generally, the value to customers of nationwide coverage. The second is the consolidation of the major firms into vertically integrated operations that bundle nationwide network access and transmission with retail services—moreover, the top two major firms, Verizon and AT&T, combine these wireless networks with nearly complete telecom packages that include wireline and broadband. The basic ingredients for a permanent oligopoly are now in place. Unfavorable consequences for consumers are developing: increasing prices, weak competition, and lagging innovation.

Now is the crucial moment for the Commission to reassert its commitment to a competitive wireless industry. If the two dominant wireless providers are able to monopolize the last low-frequency spectrum potentially available for many years then their entrenched positions will be impregnable.

Of the possible remedies, the easiest now is to designate one license for operation of a wholesale-only network providing open access on nondiscriminatory terms. This is the lifeline that local and regional operators and new entrants need. It will yield a flowering of retail competition by enabling small or local firms to offer nationwide coverage. In economic terms, it accomplishes the essential task of unbundling—vertically disintegrating—network connectivity from retail services provided over that network. This has been the successful cornerstone of U.S. regulatory policy in other network industries.

An especially favorable development is the prospect that the open-access network can be developed cooperatively with public safety agencies, recognizing however that these agencies can opt out. The economies thereby obtained, in both construction and spectrum allocation, make the entire project feasible financially for both the licensee and the public safety agencies. We urge the Commission to recognize this unique opportunity to achieve synergies with public safety, while establishing the minimal infrastructure needed to sustain competition in the commercial segment of the wireless industry.

The auction design presents important issues because the two dominant low-frequency wireless incumbents have strong incentives to thwart entry of new competitors. The auction rules

should enforce anonymous bidding, and allow bids for a designated set of packages of regional licenses and multiple bands. Bidding credits are needed for small businesses and other designated entities because the incumbents' valuations include maintenance of their oligopolistic rents if entrants are excluded. A level playing field is an essential requirement for the auction to yield an efficient outcome that serves the general welfare of the American public. The successes of earlier auctions depended on near symmetry among the bidders, but comparability among the bidders has now been lost due to the consolidations among the major firms and their control of the nationwide networks.

The 700 MHz auction is the last chance for many years to sustain competitive pressure in the wireless industry. Without measures like the ones we endorse here, the next phase could be a continuing struggle to rein in the predictable excesses of an entrenched oligopoly by invoking the Commission's regulatory authority.

## **Exhibit A**

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CV May 2007

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Associate Professor of Economics, Stanford Graduate School of Business, since July 2004.

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## Research

### Published and Accepted Papers

Yuliy Sannikov and Andrzej Skrzypacz (2007) "Impossibility of Collusion under Imperfect Monitoring with Flexible Production." Forthcoming in *American Economic Review*

Joseph E. Harrington, Jr. and Andrzej Skrzypacz (2005) "Collusion under Monitoring of Sales." Forthcoming in *Rand Journal of Economics*.

Ilan Kremer and Andrzej Skrzypacz (2005) “Dynamic Signaling and Market Breakdown.”  
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Yuliy Sannikov and Andrzej Skrzypacz (2006) "The role of information in repeated games  
with frequent actions." RR to *Econometrica*

Christopher Phelan and Andrzej Skrzypacz (2006) “Private Monitoring with Infinite  
Histories.” RR to *Econometrica*

Ilan Kremer and Andrzej Skrzypacz (2006) “Information Aggregation and the Information  
Content of Order Statistics.”

Matthew Mitchell and Andrzej Skrzypacz (2006) “Market Structure and the Direction of  
Technological Change.”

Jerzy Konieczny and Andrzej Skrzypacz (2006) “Search, Costly Price Adjustment and the  
Frequency of Price Changes – Theory and Evidence.” RR to *The B.E. Journals in  
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Qingmin Liu and Andrzej Skrzypacz (2006) “Reputation with Finite Monitoring.”

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## **ROBERT B. WILSON**

Robert Wilson is the Adams Distinguished Professor of Management, Emeritus, at the Stanford Business School, where he has been on the faculty since 1964. His research and teaching are on market design, pricing, negotiation, and related topics concerning industrial organization and information economics. He is an expert on game theory and its applications.

Dr. Wilson has been a major contributor to auction designs and competitive bidding strategies in the oil, communication, and power industries, and to the design of innovative pricing schemes. His work on pricing of priority service for electric power has been implemented in the utility industry. His book on Nonlinear Pricing (Oxford Press, 1993) is an encyclopedic analysis of tariff design and related topics for public utilities, including power, communications, and transport; it won the 1995 Leo Melamed Prize, awarded biannually by the University of Chicago for "outstanding scholarship by a business professor." His work on game theory includes wage bargaining and strikes, and in legal contexts, settlement negotiations. He has authored some of the basic studies of reputational effects in predatory pricing, price wars, and other competitive battles.

He has published approximately a hundred articles in professional journals and books since completing the Bachelor, Master, and Doctoral degrees at Harvard College and the Harvard Business School. He has been an associate editor of several journals, and delivered several public lectures. He is an elected member of the National Academy of Sciences, a designated distinguished fellow of the American Economic Association, and a fellow, former officer and Council member of the Econometric Society. The Norwegian School of Economics and Business Administration conferred an honorary Doctor of Economics degree in 1986, and the University of Chicago, an honorary Doctor of Laws degree in 1995.

On problems of pricing strategy, he has advised the U.S. Department of the Interior and oil companies (on bidding for offshore leases), the Electric Power Research Institute (on pricing of electric power, design of priority service systems, design of wholesale markets, funding of basic research, and risk analysis of environmental hazards and climate change), and the Xerox Palo Alto Research Center (on pricing product lines in high technology industries). With Paul Milgrom he designed for Pacific Bell the auction of spectrum licenses adopted by the FCC, and subsequently worked on the bidding strategy team, and later for other firms. He contributed to the designs of the power exchange and auctions of ancillary services in California, and he has continued to advise EPRI, the California Power Exchange, the California, New England, and Ontario System Operators, the Canadian Competition Bureau, Energy Ministries of several countries, and others involved in the design of auctions for electricity, power and gas transmission, and telecommunications in the U.S. and elsewhere. His designs of other auctions have been adopted by private firms. He has been an expert witness on antitrust and securities matters.

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National Academy of Sciences:	elected Member	1994-
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Game Theory Society:	Council member 2001–2005; Morgenstern Lecturer at 2004 World Congress.	

Fellowships: CORE, University of Louvain, Belgium, Visiting Professor 1967. Ford Foundation Faculty Research Fellow 1968. Center for Advanced Study in the Behavioral Sciences 1977-8. Guggenheim Fellowship 1982-3.

Research Programs: Stanford Center on Conflict and Negotiation 1987-2001; Director 1990. Harvard Law School, Program on Negotiation, Affiliated Faculty 1993-2001. Stanford Institute for Theoretical Economics, Director 1993-5.

Associate Editor: *Econometrica* 1979-85. *Mathematics of Operations Research* 1988-90. *Journal of Risk and Uncertainty* 1987-91. *Journal of Regulatory Economics* 1988-94. *Review of Economic Design* 1998-2002. *Games and Economic Behavior* 1988—. *Journal of Economic Dynamics and Control* 1995—2006.

Public Lectures: Norwegian School of Business and Economics, Borch Memorial Lecture 2004. Boston University, Rosenthal Memorial Lecture 1993. University of Oslo, Leif Johansen Award Program 1997. Tel Aviv University, Elisha Pazner Memorial Lecture 1997. Northwestern University, Nancy Schwartz Memorial Lecture 1994. Hebrew University of Jerusalem, Oskar Morgenstern Lecture 1994. Helsinki School of Economics, Union Bank Lecture 1991. MIT, Inter-Session Lectures 1984.



## **PUBLICATIONS OF ROBERT WILSON**

### **DISSERTATION**

A Simplicial Algorithm for Concave Programming. Boston: Harvard Business School, 1963.

### **BOOK**

Nonlinear Pricing. New York: Oxford University Press, 1993. ISBN 0-19-506885-8. Paperback edition 1997.

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### **EDITOR**

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